

**Evaluation of U.S. Army Assessment
of Patriot Antitactical Missile Effectiveness
in the War Against Iraq**

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ARMY ASSESSMENT OF PATRIOT EFFECTIVENESS

INTRODUCTION

This report responds to a Committee request to evaluate the U.S. Army's assessment of the Patriot missile's success in destroying Iraqi Scuds in the Gulf War. The purpose of this report is to evaluate whether one should have high confidence in Army claims that Patriot missiles intercepted and destroyed a large percentage of Scud warheads. The purpose is not to determine how effective Patriot missiles were against Scud warheads. Included as Appendix 2, per the Committee's request, is a compilation of official statements regarding Patriot performance in the war, reported ground damage from Scud attacks, and claims of Patriot success.

The first part of this report recounts depictions of Patriot's role during Desert Storm as a widely perceived success. Except for a few concerns raised over the past year regarding damage from Patriot-Scud engagements, serious questions regarding the Army's data surfaced only recently. After a brief review of why it is important to get as accurate a picture as possible of the Patriot antitactical missile (ATM), the bulk of the report focuses on: 1) a discussion of the data sources used by the Army, raising questions over how much confidence should be placed in them; and 2) an evaluation of the Army's stated methodology for deciding Patriot success in destroying Scud warheads.

This report raises many questions about the Army's data and analysis.

The Patriot ATM and Desert Storm

The Patriot is an Army mobile, surface-to-air, air-defense missile system. Raytheon designed and produces the Patriot system. Martin Marietta is the principal subcontractor. With strong congressional support,¹ the Army in the 1980s, working with the contractor, further enhanced the Patriot system to provide a limited-area defense against short-range ballistic missiles (SRBMs). This antitactical missile (ATM) capability is incorporated into the Patriot PAC-2 missile. According to the Army, PAC-2 engineering tests against missile targets were completely successful before and during Desert Shield.

The United States deployed Patriot PAC-2 systems to Saudi Arabia during Operation Desert Shield, which followed after the Iraqi invasion of Kuwait in August 1990. At the beginning of Desert Shield, however, the United States had only 3 PAC-2 missiles. PAC-2 production was accelerated to meet expected demand. By January 1991, 480 PAC-2 missiles were available.² Near the

¹ U.S. Library of Congress. Congressional Research Service. The Patriot Air Defense System and the Search for an Antitactical Ballistic Missile Defense. Report No. 91-456 F, by Steven A. Hildreth and Paul Zinsmeister, Washington, June 16, 1991.

² From an Army briefing on Patriot performance during Desert Storm, given in January 1992.

outset of Desert Shield, the United States also agreed to send Patriot PAC-2 systems to Israel. The systems destined for Israel were not yet deployed when the coalition against Iraq began its air campaign on Jan. 17, 1991.

During Operation Desert Storm, Iraq reportedly launched 81 modified-Scud tactical ballistic missiles (TBMs) into Israel and Saudi Arabia.³ Patriot missiles engaged most of those Scuds.⁴ Patriot missiles did not engage those where the Scuds' predicted impact points fell outside areas defended by the Patriot. In a few cases, Patriot missiles did not engage Scuds because of Patriot system failures. Of those Scuds engaged, the Army claimed in Dec. 1991 that in Saudi Arabia Patriot successfully engaged over 80 percent of the TBMs within its coverage zone and in Israel Patriot successfully engaged over 50 percent of the TBMs in the coverage zone.⁵ These numbers are similar to those released by Rep. Les Aspin shortly after the war.⁶

During the war, Patriot appeared to be highly successful against these attacks. Global media reporting, including live camera coverage throughout Desert Storm, portrayed Patriot's performance against Iraqi missiles as a technological marvel. In daily briefings, U.S. and Saudi military officials validated what everyone seemed to be seeing on television (see Appendix 2). When the war was nearly over, President Bush extolled Patriot's near-perfect effectiveness in a nationally televised speech to employees of the Raytheon Missile Plant.

After the war, policymakers throughout the Government continued to assess Patriot as a highly effective missile defense system. This support helped justify budget requests for additional improvements to the Patriot system, funding increases in the Strategic Defense Initiative (SDI), and plans to proceed with a limited strategic missile defense of the United States.

Positive media coverage and official statements largely shaped the public perception of Patriot's high level of effectiveness in the Gulf war. The basis of the official U.S. Government view was a classified Army analysis provided to

³ This number was the last number given at the daily military briefings. See Pentagon Briefing. Feb. 28, 1991. Office of Assistant Secretary of Defense (Public Affairs). Transcript. p. 1.

⁴ The term "engaged" here means that a Patriot PAC-2 missile was fired at a Scud missile in an attempt to destroy its warhead.

⁵ Brig. Gen. Robert A. Drolet. PEO Air Defense Response to Patriot Criticisms. Inside the Army. Dec. 9, 1991.

⁶ Shortly after the war, Chairman Les Aspin (House Armed Services Committee) stated that 89% of the Iraqi Scuds directed against Saudi Arabia were intercepted, and 44% of the Scuds' warheads were intercepted in Israel. Rep. Les Aspin. Understanding Technology on the Battlefield: Lessons of Desert Storm for a Defense that Works, Speech before the American Institute of Aeronautics and Astronautics, May 1, 1991. p. 4.

Defense Secretary Cheney a few months after the war ended. Subsequently, the Army developed a more thorough assessment, which sought to detail Patriot's effectiveness against Scud warheads in terms of warhead kill, mission kill, and no kill.⁷ In this assessment, the Army did not seek to assess overall Patriot system performance⁸ nor attempt to deal with the issue of ground damage or casualties caused by falling Scud or Patriot debris, or both.

General Issues

If an accurate understanding of Patriot's effectiveness against Iraqi-Scud warheads in Desert Storm is important to public debate and defense planning, then a credible account should be part of the public record. This is difficult, however, because perfect information on Patriot performance is not available and because the Army's assessments remain classified. These issues are raised below.

Importance of Patriot Effectiveness

An accurate assessment of Patriot effectiveness is necessary for at least three important reasons:

- national defense preparedness and the lives of U.S. soldiers in future conflicts may well depend on contingency plans that assume a certain level of Patriot effectiveness against SRBMs (short-range ballistic missile) attacks;
- the lives of U.S. allies and friends who get Patriot ATMs also may well depend on presumed levels of Patriot effectiveness; and
- Patriot's effectiveness against Iraqi Scud missiles is an important part of the policy debate over the future of U.S. strategic and theater missile defense programs.

⁷ In its assessments of Scud missile engagements, the Army uses the following kill definitions:

- **Warhead Kill:** destroyed the Scud warhead by causing it to explode, detonate, incinerate, or caused the Scud warhead to dud.
- **Mission Kill:** the intercepted Scud was diverted with no significant ground damage in the defended area.
- **No Kill:** a high order explosion on the ground was experienced that caused significant damage.

The term warhead kill is used in this report whenever the Army makes such a claim.

⁸ Besides the issue of Patriot missiles destroying Scud warheads, other system performance questions include, for example, why the system failed to launch missiles when operators wanted, why the system launched automatically against false targets, why Patriot missiles launched and plunged into the ground soon thereafter, and why software adjustments were needed throughout the war.

Difficulty of Getting Accurate Information

Securing accurate and timely information is always a problem during war and in studying warfare, including the distillation of lessons. Accurate information can be challenging to collect and difficult to coordinate, disseminate, or record while under fire in the field. A recent case in point, discussed later, details this problem. It therefore might not be surprising if there are problems with data collected for the Patriot system in Desert Storm.

Security Classification

The Army's claims of Patriot effectiveness in Desert Storm are classified, as is most of the material supporting its claims. This complicates debate over details. This report raises questions about the Army's approach, which is unclassified, based on these classified sources.

Purpose

This report was prepared in response to a Committee request. Specifically, the report focuses on a detailed assessment of Patriot effectiveness given to the House Government Operations Subcommittee on Legislation and National Security and other legislative branch staff in February 1992.⁹ The report questions the validity of the Army's data and analysis, and assesses whether the data supports its specific claims of warhead kills. The Army said that all the data they used to support their claims were in these reports. This evaluation raises many questions about how much confidence should be placed in the data and how well the data support the Army's assessments; it also asks whether additional data and analyses might have been available or could have been pursued.

Some have questioned whether more data could or should have been generated by the Patriot system itself during the war. That debate goes beyond the scope of this paper.

AREAS OF CONCERN

The Army's briefings and reports assessing Patriot's effectiveness in Desert Storm raise many questions. These questions are organized around three broad areas: 1) the data used by the Army; 2) the Army's assessment of Patriot's effectiveness against Scud warheads based on these data; and 3) additional data sources and analysis the Army might have pursued for its assessments.

⁹ Army briefings were given to Subcommittee and other legislative branch staff in January 1992. This was followed in February by a trip to Huntsville, Alabama, where the Army detailed each Patriot-Scud engagement and presented the data in support of their case.

Data Used by the Army

Sources

The Army's briefings on Patriot effectiveness remain classified. So too do the Army's briefing books and analysis,¹⁰ and almost all of the data in the data sources. In the most important volume, which details the Army's claims of Patriot effectiveness in Desert Storm,¹¹ the Army lists the unclassified titles of the data sources it used. They can be placed into two categories. One category consists of hard or physical evidence. The other consists essentially of human action-after reports or analysis.¹² Appendix 1 lists the data sources in both these categories.

The hard or physical evidence used by the Army consists of launch data statistics on Iraqi Scuds during Desert Storm, various recording tapes and tracking data, and unclassified video and photographic documentation. Of these sources, however, the Army assessments of warhead kills relied heavily and consistently upon one: classified SRBM launch data from the U.S. Space Command and the U.S. Army Missile and Space Intelligence Center.¹³

Human after-action reports and analyses used by the Army consist of ground-damage reports, an internal Army summary of reports of Patriot-Scud engagements, Patriot unit reports of Scud engagements, a U.S. Army-Israeli technical assessment of Patriot effectiveness, and newspaper accounts. Of these sources, the Army assessments of warhead kills relied most heavily and consistently upon two: a classified draft Ballistic Research Laboratory (BRL)

¹⁰ (1) Patriot Presentation to Congressional Staff Members, Feb., 1992, which relied on several other reports: Patriot Contingency Theater ATM Performance Report (Revision 4) (U), Sep. 5, 1990; Desert Storm Performance (U); and Defense Design (U). (2) An Army assessment of Patriot's performance in Desert Storm. (3) Summary of Patriot Performance in Desert Storm (U), Feb. 10, 1992. (4) Data Supporting Patriot's Desert Storm Assessment, Data Book (U), Feb. 1992.

¹¹ Data Supporting Patriot's Desert Storm Assessment (U). Feb. 1992.

¹² These refer to reports, either descriptive or analytical, which are written sometime after the event has occurred. In some cases, they can rely on physical data if it's available, but they are more often the product of recollection or subsequent analysis.

¹³ These data sources provide evidence of Iraqi-Scud launches during the war, the location of the launch, and the direction of the Scud missile. See New Details on DSP Usage. Defense News. March 23-29, 1992. pp. 4, 29.

report on Patriot effectiveness and the Army's classified TSM (Training and Doctrine Command Systems Manager) Patriot-Scud summary.¹⁴

Confidence. An inherent problem in the study of warfare is obtaining accurate data and information. This is especially so when information is based largely on human memory, even from highly trained professionals. A recent case in point is the 1988 Vincennes incident, where the United States mistakenly shot down an Iranian passenger plane.¹⁵

Human error probably led to the shooting down of the Iranian plane. In addition, serious problems with memory were proved in the ensuing investigation. In Committee hearings, Chairman Les Aspin made three observations about relying on memory, citing the Vincennes incident as an important example.¹⁶ First, he said, in conflict people get "unnerved, excited," and can do things they are trained not to do. In one sequence, for instance, a Navy operator pushed the wrong button twenty-three times trying to get a part of the ship's defense system to do something. In his reports, the operator said he pressed the correct button a few times. Aspin also said the incident "raises questions to me about what has happened . . . where we don't have this kind of [hard or physical] data, and we rely on people's recollections and rely on people on the scene." The physical evidence available in this case--AEGIS radar recording tapes--proved conclusively that the recollections of officers directly involved were wrong on basic facts, such as whether the Iranian plane was ascending or descending as it flew toward the ship. He concluded that "I think it raises very serious questions as to all the other reports that we have ever done [regarding other incidents], whether in fact that is what ever really happened" because we lacked hard evidence.

Because the Army's assessment on Patriot effectiveness relies heavily on human after-action reports, questions can be asked concerning how much confidence should be placed in these types of reports and on judgments based heavily on them. As one senior U.S. military official observed during relevant

¹⁴ The BRL report was used in assessing warhead damage on the ground. The TSM report is a summary of reports of Patriot-Scud engagements collected by Army personnel in Texas during the war.

¹⁵ On July 3, 1988, the U.S. cruiser Vincennes shot down an aircraft that its crew thought was an Iranian F-14 approaching the ship to carry out a possible attack. In actuality, it was an Iranian commercial flight. All 290 passengers on board were killed.

¹⁶ U.S. Congress. House. Committee on Armed Services. Iran Air Flight 655 Compensation. Hearings, 100th Congress, 2d Session. Aug. 3 and 4, Sep. 9, and Oct. 6, 1988. Washington. U.S. G.P.O. 1989. p. 182.

wartime briefings: "a lot of things are happening very quickly, and it's almost impossible . . . for observers just to stand there and know what is what."¹⁷

Some types of physical evidence also may have significant, inherent shortcomings. For example, the Army did not rely on the extensive amount of camera and video documentation it obtained during and after the war. The Army maintains that it does not have high confidence in capturing a high-speed event, such as a missile interception on simple recording equipment. In tests at White Sands Missile Range, the military employs many high-speed cameras to analyze a missile interception. Such cameras were not used in Desert Storm operations of the Patriot system. If the Army had relied primarily, if not exclusively on hand-held video camera footage, high confidence in its assessments might not be possible.

Other physical evidence can produce considerable useful information when it is available. For example, hard copy track amp (amplification) data can be used to show a Scud missile track (its speed, location, and projected path), as well as some details of a Patriot engagement.¹⁸ The problem is that such data are not automatically available to Patriot fire control officers, who must press a button to produce a printout of the event at that moment. Under fire, such data can be challenging to generate. Moreover, these data alone cannot prove that a warhead was intercepted (this is an important point and is detailed later in the section on methodology).

Thoroughness and completeness. Something to consider in evaluating the data sources used by the Army is whether the data is consistently available, or whether it is uneven. On close examination, many data sources consist of only bits and pieces of information. By itself, this is not necessarily critical. Complete data should not be expected from wartime operations. The issue is whether complete data would change the Army's assessment and how importantly the data used weighs in individual engagement assessments. Some findings regarding the thoroughness of Army data are cited below.

- The SRBM launch data appears to be very good, but there are a couple of notable exceptions.
- Hard Copy Track Amp Data of any sort are presented in only about twenty percent of the cases where the Army claims a warhead kill. In only one case do the track amp data show that a Patriot missile fuzed on its target. With that engagement, there is additional track amp

¹⁷ Lt. Gen. Thomas Kelly also said: ". . .it's very, very hard to tell immediately, or within a few hours, even after the event, precisely what happened and what fell where. That takes a long time to sort out. In some cases, you never know for certain what exactly, what pieces of what fell where. It's very hard to sort that out." Pete Williams, Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Jan. 25, 1991. Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp. 12-13.

¹⁸ Cable News Network (CNN). Broadcast. Jan. 22, 1991.

data that strongly suggest the Patriot hit the target. By itself, however, track amp data cannot prove that Patriot hit, destroyed, or caused the Scud warhead to dud.

- The Army said it relied on ICC reports, which are battalion level accounts of Patriot-Scud engagements, for about a quarter of the cases it claimed a warhead kill. Reports from only one engagement, however, can be found in the data books.
- The TSM report appears to account for only about eighty-five percent of the Patriot-Scud engagements where the Army claims a warhead kill.
- Questions can be raised about the thoroughness of the BRL report. In one engagement, for example, the Army uses the BRL report to show there was no ground damage reported. U.S. and Saudi officials, however, reported finding Scud and Patriot debris in a crater after an attack. In another case, Saudi military officers confirmed damage from a Scud attack, and journalists reported seeing a Scud missile or fuel tank lying in the street. The Army relies on the BRL report to say there was no damage reported.
- In only a few Patriot-Scud engagements where the Army assesses a warhead kill does it include copies of any Operator Reports (after-action reports written by Army Patriot military officers). In another case, the Army says it relied on an operator report for its warhead kill assessment. The data books, however, do not include that report. In many other cases, the Operator Reports are not included, but apparently are summarized instead.

Consistency. The Army's data sources do not always support each other. Often there is disagreement over the facts. This by itself is not necessarily important. One could expect some reports, particularly after-action reports, to differ. Questions about the reliability of the data can be raised, in part because no guidelines for ranking data sources is presented. Also, no guidelines for deciding when or if those sources should be used is presented. This issue is treated in more detail later. Some examples are mentioned below.

- Questions can be raised about why and when the Army used SRBM launch data to support its warhead kill assessments. In one case, the Army discounted the absence of SRBM launch data. In two other cases, the Army discounted SRBM launch data that supported additional Scud launches.
- The TSM report, which the Army apparently relied on heavily (and sometimes, the Army said, primarily), often does not generally agree with the final Army assessment. Questions can be raised with more than forty percent of the Army's assessments when compared to the TSM reports. These questions include basic differences over what happened in those engagements.

- Operator Reports (or their summaries) were available in only about a third of the cases. There is not complete agreement between them and the Army assessments. In one instance, the Army assessment and the operator reports completely disagree whether there was an intercept; in another, there is dispute over how many Scud warheads Patriot missiles destroyed; in two cases, the Army assesses a warhead kill, yet the operator reports only suggest this may have occurred; in one case the Army says a unit report is the basis of its assessment, yet that report is not included; and in many instances, the operator reports appear to disagree among themselves.
- In about twenty percent of the assessed warhead kills, it appears that the predicted impact areas of those warheads could have been in open, or sparsely populated areas within Patriot's area of coverage. In all those cases, the Army used the BRL report to argue that there were no reports of ground damage. Because the BRL report did not conduct a comprehensive search of areas where warheads may have fallen, however, a case can be made that some warheads may have detonated in desert areas without witnesses, or some could have duded on their own.

Adequacy

The preceding issues can raise questions about whether the data is sufficient for the Army to assess Patriot effectiveness. Does the Army's use of the data appear reasonable? Here too, questions can be raised, specifically regarding timeliness, the intended use of the data source, how to interpret the data, and how much coordination with other countries and sources occurred.

Timeliness. At issue here is whether the data collection or analysis occurred at a suitable or opportune time. How far removed in time from the event was a record of the data made? This issue is especially important when assessing confidence in descriptive after-action reports. With the more analytical reports, one can ask whether it's possible to go back and gather sufficient physical data for assigning high confidence to findings or conclusions. One primary data source, in particular, raises these kinds of questions:

- The BRL report examined physical evidence days or weeks after the event occurred. By then, questions could be raised over whether evidence was missing or missed, how well some types of damage could be assessed, and how much damage might have been repaired during the intervening time. This might make any assessment of Patriot effectiveness based on ground damage problematic.

If the Army decides to generate new operator or summary reports (or for that matter any other after-action reports) months, or now more than a year after the Gulf War has ended, the same questions can still be asked. As noted earlier, inherent problems exist with such reports; the passage of considerable time might only aggravate such problems.

Intended use. The intended use of recorded data or event information should be weighed. If data is gathered in a timely manner by trained professionals, then that information could be helpful and one could have some degree of confidence in it. If information is collected informally, or in an *ad hoc* manner, the utility of that information, especially for detailed support as a primary corroborating source, is questionable. For example:

- The TSM summary report apparently was not intended for the Army's assessment. As a result of the informal manner in which TSM collected the data, the number of warhead kills they reported is about thirty percent higher than what the Army assessed. This raises questions as to what was interpreted as a warhead kill, and who was making those assessments.

Interpretation. Many questions regarding data interpretation can be asked. For example, where there are discrepancies or gaps in information, how much explanation did the Army receive, or how much interpretation was available? How much genuine support was given to the Army from other governments or agencies to understand apparent inconsistencies or gaps in information?

- There are internal discrepancies in almost all of the Israeli Defense Performance Data Sheets. These discrepancies are intrinsic to the reports and are apparent in just reading the reports themselves. Reportedly, the Army had to resolve these without assistance from the Israelis.
- There are discrepancies with and among Operator Reports from Saudi Arabia. It is not clear how the Army sought to adjudicate these differences.
- There are many differences with and missing data between the Army assessment and the TSM summary. It is not clear how these differences were interpreted.
- There are instances where the Army assessment claimed that a data source said something directly about a warhead kill, when, upon inspection, the original data source either said nothing supporting that assessment, or may have suggested a different conclusion, such as a mission kill.
- In one engagement the Army claims a warhead kill, while the TSM data record an assessment acronym different from all but one other case. In that other case, which the Army assessed as a no kill, a high order detonation from a Scud warhead destroyed a school.

Coordination. Many questions can be raised over the degree to which the Army correlated its findings with others. This issue is examined in several groupings below. First, there is the question of government-to-government coordination.

- Questions can be raised over the degree to which coordination with Saudi Arabia took place. On Jan. 23, 1991, Saudi officials announced that "a joint Saudi and U.S. committee has been formed to investigate all military questions relating to the Scud attacks and the resulting damage. . . . The Saudi Civil Defense Office has an ongoing investigation as well, and the two groups will cooperate and exchange information as necessary."¹⁹ Reports from these groups are not presented in any of the Army's analyses.
- Questions can be raised over the degree to which coordination with Israeli assessments took place. The public perception is that Israel's evaluation of Patriot effectiveness was notably lower than the Army's. If true, how well did the Army coordinate its own assessment with the Israelis? Are there additional Israeli reports that would be beneficial to the Army's assessment? One of the data sources is a joint Army-Israeli assessment of Patriot performance. The problem, however, is that in this report there is little analysis of the issue of warhead kill rates in Israel.
- Shortly after the war began, Saudi officials said they would limit public discussion and video coverage of ground damage from Scud attacks. Was there thorough, follow-up coordination with Saudi officials and sources? If not, questions could be raised over how much confidence the Army should have in its understanding of the extent of ground damage in Saudi Arabia.
- There are eyewitness reports²⁰ that some Scud warheads contained nothing but concrete. There is little or no treatment of this issue, which, if true, has important implications for the Army's assessment.

Second, there are questions about whether extensive inter-agency or inter-service coordination occurred.

- There is one case in particular where Army coordination with other U.S. military branch or agencies could have provided conclusive evidence in their analysis. Subsequent coordination may now force the Army to reverse its original judgment.
- Other military branches or U.S. agencies may have been able to help provide additional analyses of physical evidence collected during the war, such as any debris or dudded warheads. How far this was pursued is not clear.

¹⁹ Joint Arab Forces Command Briefing, with Col. Ahmed al-Roboyan. Riyadh, Saudi Arabia. January 23, 1991. Transcript.

²⁰ Telephone conversation between the author and an observer who saw these warheads recently. March 1992.

- The degree to which the Department of Defense critically reviewed the Army's analysis is not clear.

Third, if the Army's report used publicly available sources more systematically, some of the questions raised by the data might have been clarified.

- There are extensive newspaper accounts, military statements, and video documentation available. One cannot generally have high confidence in these sources collectively. However, this information might have been helpful in better understanding some individual Patriot-Scud engagements that clearly needed clarification. The Army used these sources in very few instances.

Army Methodology for Assessing Data

General Procedure

It is important to understand the basic approach the Army took in assessing Patriot effectiveness because it reveals strengths and weaknesses. This is described below. In one sense, this task was simplified because the Army outlined that approach.²¹ However, questions can be raised over whether this approach was adequate and whether the Army used it consistently.

Framework for deciding effectiveness. In the Patriot presentation to congressional staff (cited before), the Army specifies which data it used to assess the various aspects (or categories) of a Patriot-Scud launch, engagement, and outcome. The Army table is included on the following page:

²¹ Some of the congressional staff who examined the Army's assessment concluded there was either no methodology behind it, or the Army's methodology consisted of simply making the best case. This report assumes there was a methodology because the Army made an explicit case for it.

Assessment	Evaluation Data
Scud Launched and Arrived	SPACECOM and MSIC Data
Scud Engageability	SPACECOM, MSIC, ECS, Video, Unit Reports, and Israeli Reports
Patriot Detect and Track of Scud Warhead	ICC, Experiment 2, ECS, Tab Hardcopy, Unit Reports
Patriot Missile(s) Fired	ECS, ICC, Experiment 2, Video, Unit Reports
Warhead Intercept Occurred	Probable Kill Indication (ECS, Tab Hardcopy, ICC, Experiment 2, Operator Observation), Video, Eyewitness Reports
Warhead Damage on the Ground	Pictures, Video, Eyewitness, Unit Reports, Investigation Reports (Israeli, BRL, TSM), Media Reports

The Army stated that its methodology for assessing Patriot effectiveness consists of using the data to assess each aspect of a Scud launch and Patriot engagement, then using their kill definitions to score each engagement (i.e., warhead kill, mission kill, or no kill). The approach seems reasonable, but on closer scrutiny questions can be raised over whether the evaluation data can support several of the assessment categories. For instance:

- The third category asserts that the evaluation data cited can establish that a Scud warhead was tracked. Scud missiles broke up throughout the war, so tracking warheads was problematic. The Army told us that over time Patriot operators could distinguish warheads from debris, which may be so, but the data presented by the Army does not make this case.
- The fifth category says that a warhead intercept can be assessed from the kinds of data shown. This too may be misleading. The probable kill indication only shows that a Patriot battery computer guided a Patriot missile to an object tracked as a TBM and that the Patriot fuzed²² on that object. The probable kill indication cannot show that a Patriot hit or disabled the object. Additional hard copy track amp data would be needed to verify if the object was affected in any manner immediately after the probable kill indication was shown.
- Data sources cited to support the sixth category, assessing warhead damage can be unsatisfactory. Questions can be raised, for example, over whether systematic or appropriate tests were conducted in or

²² The Patriot warhead exploded within a specified, theoretically lethal, range of that object.

around craters found after a Scud attack to learn what caused that crater. In the Gulf war, considerable Scud debris, including fuel tanks, and Patriot missiles impacted and detonated on the ground. If a crater was examined after debris was removed or after a crater was filled, it could be difficult to learn the exact cause.

Questions also can be raised concerning how well the Army applied their own methodology in claiming warhead kills:

- In only about a third of the Army's claims of a warhead kill is there evaluation data for every assessment category. The percentage is markedly better in Israel than in Saudi Arabia.
- At least one claim of a warhead kill appears to have sufficiently credible data²³ for every one of the assessment categories. We did not find that degree of sufficiency in the others claimed by the Army.
- In one engagement, it appears that the Army could claim a successful engagement based on its own data and methodology. Yet for other reasons the Army chose to assess that case as a no kill.

Part of the problem here seems that for some categories (dealing with the Patriot-Scud engagement), the Army simply did not have the data, or did not include it when it was cited. Instead, the Army apparently substituted information taken from the TSM summary for perhaps more than eighty percent of the cases, even though it is not mentioned as a data source for those categories.

Resolution of inconsistencies and gaps. There were many inconsistencies and gaps in the data used by the Army. This could be expected during a war. This is not necessarily a problem if there is a well defined methodology for consistently resolving those dilemmas. The Army's assessment, however, does not detail such an approach. Instead, an argument can be made that if there is a systematic effort, it consists of balancing many gaps and inconsistencies in favor of sources that suggest a warhead kill could be presumed.

Preciseness of conclusions. Given the many questions raised over how much confidence should be placed in most of the data sources, one could ask whether judgments made from that data could or should be precise. This point may be the most important one to consider in evaluating the Army's assessments. Some might consider the Army's scoring system of warhead kill, no kill, or mission kill, procrustean. This approach leads only to black or white judgments. There is no room for uncertainty in individual or collective scoring of Patriot-Scud engagements. The Army's scoring system therefore raises questions over how much confidence should be placed in its assessments.

²³ "Sufficiently credible data" here means two things. First, quantitatively, there must be some evaluation data for each category. Second, qualitatively, the data in each category must be sufficient to make the case and not raise important questions.

Assumptions

Negative proof. A critical part of the Army's assessment in most cases was whether any ground damage was reported, because, they said, the absence of damage proved a Scud warhead did not detonate. The primary data source for this evidence was the BRL report, over which many questions have already been raised. If the BRL report was silent on any ground damage, the Army assumed that constituted proof the warhead was destroyed. In cases where the warhead likely fell in a dense urban or suburban area, this assumption may not be unreasonable. In empty or sparsely populated areas, however, this assumption may be presumptuous. If damage was reported to local authorities but kept from Army personnel this assumption would be suspect. Finally, if there were a significant percentage of dud or concrete Scud warheads, the assumption also would be suspect.

Scud missiles and Patriot performance. Another critical part of the Army's assessment was that Patriot missiles could be expected to engage and destroy Scuds. This assumption was based on Patriot ATM tests conducted during the late 1980s and through Desert Shield, which provided the Army with data about performance and limitations. Although these tests apparently were conducted within Defense Department guidelines and procedures, questions can be asked as to whether the Army should have had high confidence in the ability of the Patriot ATM to engage and destroy Iraqi Scud warheads. Questions can be asked whether the Government understood the potential threat from Iraqi Scuds before the war began.

Other Data and Analysis Not Used

An important question that could be raised is whether the Army limited itself too severely in the types of data and analysis it used to assess Patriot effectiveness against Scud warheads. On reflection, there may be many other avenues of data collection and analysis. Some of these efforts might strengthen the Army's case for Patriot effectiveness against Scud warheads, while others might weaken it. This section briefly mentions some of these additional data sources and analysis.

Additional Data Sources

Additional data may be available from many sources: Israel (military, industry, private sources); Saudi Arabia (civil authorities, public sector); and U.S. or other agencies (lessons regarding Scud performance and dudding rates in the Iran-Iraq war, or from the Iraqi-Scud missile test program, and the Patriot test program itself, which might reveal important, useful data regarding warhead kills).

Additional Analyses

Additional, useful analyses would include: modelling Iraqi-Scud performance and using maps or photographs of predicted impact areas to assess confidence in reports of no ground damage; and, a systematic analysis of Patriot

effectiveness over time in Israel and Saudi Arabia given operational experience and software improvements in the field. The Army might also consider reevaluating its scoring system to account for levels of uncertainty. New categories of probable kill, probable miss, and unknown might enhance confidence in a future Army assessment of Patriot effectiveness in Desert Storm.

CONCLUSION

The data used by the Army raise many questions that create uncertainty over how much confidence can be placed in what the Army used to assess warhead kills. Again, by itself, this may not be detrimental. Much depends on how the Army used that data and resolved inconsistencies in its analysis. Here, it appears that the Army relied heavily on key sources in which high confidence may not be justified. Key data in which one could place high confidence was scarce.

The method used by the Army to assess warhead kills appears reasonable on first inspection, but on closer scrutiny serious questions can be raised. One is that the reliability of the data is not high enough to support key portions of the Army's assessment scheme. Another is that the Army did not use its assessment methodology consistently. These points form a basis for having substantial concern regarding the strength of the Army's case.

In conclusion, the Army does not appear to have sufficient data to assign high confidence to its claims of Patriot effectiveness against Iraq in Desert Storm. It is not clear what data the Army primarily relied on when Secretary Cheney received his briefings on Patriot effectiveness. It is clear that since then additional data and analysis has been generated. Apparently, further data is being collected even now. It is possible that the Army's claims of effectiveness may yet be shown to be correct with a high degree of confidence, but that is not now the case.

APPENDIX 1: SOURCES USED BY ARMY**HARD OR PHYSICAL EVIDENCE**

- SRBM Launch Data (U). U.S. Space COMMAND (USSPACECMD DEFSMAC). Feb. 27, 1991.
- SRBM Launch Activity (U). U.S. Army Missile and Space Intelligence Center Report. May 16, 1991.
- Track Amplification Tabular Data From Many Saudi Arabian and Some Israeli Target Track Files (U).
- Experiment 2 Display Copies From Riyadh (U). Jan. 21, 1991.
- Mission Recording Tapes From Tel Aviv of 9, 11, and 19, February 1991 (U).
- VHS Videos (U): Israel Intercepts Jan. 22, 25, 26, Feb. 2, 9, 11, 12, 19, 1991; IR Camera Coverage for Feb. 11, 12, 19, 1991; ECS Situation Displays for IDF-1 and IDF-2; and Dharan, Jan. 21, 1991 (U).
- Israeli Impact Photos (U). Feb. 6, 1992.
- Photos--Scud Parts/Destroyed Warhead (U).
- Photos of Ground Damage in Saudi Arabia (U).

HUMAN AFTER-ACTION REPORTS & ANALYSIS

- PATRIOT Effectiveness in Intercepting and Destroying Scud Variant Missiles in Southwest Asia (U). Ballistic Research Laboratory. Draft Final Report. Feb. 1, 1991.
- Scud Summary (U). U.S. Army TRADOC System Manager (TSM) HIMAD (High & Medium Altitude Air Defense) Data Sheets. Apr. 18, 1991.
- Israeli Defense Force (IDF) Performance Data Sheets/Plots, "Desert Storm Israeli Results (U)". Dec. 31, 1991.
- Joint U.S. Army and Israeli Defense Force (IDF) Technical Assessment of Patriot Performance (U). Mar. 8, 1991.
- Unit Engagement Reports (U).
- Public Newspaper Articles (U).

APPENDIX 2: OFFICIAL STATEMENTS ON PERFORMANCE OF PATRIOT ATM DURING DESERT STORM

This appendix includes a compilation of official, military, and Administration statements regarding the performance of the Patriot system against Iraqi Scud missile attacks made during and after the war. Some sections are highlighted for particular attention.

JANUARY 18, 1991

Riyadh, Saudi Arabia: At a U.S. CENTCOM (Central Command) Briefing, Gen. H. Norman Schwarzkopf said: "Of course the significant news today, I'm sure you all know about, but there were seven Scuds fired early this morning against Israel, and there was one Scud missile fired against Dhahran. **The one Scud missile that was fired against Dhahran was destroyed by a United States Army Patriot missile.** Fortunately, the seven missiles that were fired against Israel I would characterize as having yielded absolutely insignificant results. As a result, I think to date we can say that the enemy Scud campaign has been ineffective."²⁴

Riyadh, Saudi Arabia: In a CNN interview, the Saudi Ambassador to the UN asked about an Iraqi Scud attack against the air base near Dhahran. Amb. Shibabi said "**there is nothing more that I have at this time more than we heard on CNN....the rocket was hit enroute and that no damage has taken.**"²⁵

The Pentagon: At a Pentagon briefing, the following question was asked: "as long as any of those Scud missiles are still around, that we can't really protect Israel . . . what about the Patriots that we sent to Israel?" Gen. Thomas Kelly answered: "**...If you want to know what Israel's capability is to counter the missiles when they get there, you're going to have to ask Israel.**"²⁶

JANUARY 19, 1991

Riyadh, Saudi Arabia: At the U.S. CENTCOM briefing, Gen. Robert Johnston said: "Today there have been three reported launches of Iraqi surface-to-surface missiles, and all three of these missiles were launched towards Israel."

²⁴ Gen. H. Norman Schwarzkopf. CENTCOM Briefing. Jan. 18, 1991 (7:00 a.m. EST). Riyadh, Saudi Arabia. Transcript. Office of the Assistant Secretary of Defense (Public Affairs), pp. 1-2.

²⁵ CNN Interview with Amb. Samir Shihabi, Saudi Ambassador to the United Nations. January 18, 1991. Transcript.

²⁶ Lt. Gen. Thomas Kelly, and Rear Admiral John McConnell. Jan. 18, 1991 (4:30 p.m. EST). Pentagon Briefing. Transcript. Office of the Assistant Secretary of Defense (Public Affairs), p. 5.

Reports indicate at this time that one landed within Israel, and two others are unaccounted for. This brings the total for the last two days to 11 surface-to-surface missiles fired by the Iraqis. I might make a comment here, that **today at 3:57 there were two Patriot missiles fired unintentionally from a location inside Saudi Arabia. The missile firing resulted in no personal injuries or damage, and we are now investigating the cause of those launchings.** Several questions were also asked and answered:

Q: "Can you tell me how it's possible you unintentionally fired Patriot missiles, and were they the ones seen here from Riyadh?"

A: Until we've investigated, I think it's rather difficult for me to predict and to speculate, quite frankly, on how they were launched.

Q: Were they the ones from here that were seen?"

A: It is my understanding that those are the ones that were seen on your video screens, yes.

Q: Can you just confirm that they were either by self destroyed [sic] in the air, or what did happen to them?"

A: They were destroyed."²⁷

Riyadh, Saudi Arabia: The Saudi Press Agency reported: "An official military source in the Saudi Jt. Command and Operation Theatre said two Patriot missiles were mistakenly fired due to a technical error at 17:30 pm. The two missiles exploded in the air without causing any damages, the source said."²⁸

JANUARY 20, 1991

Riyadh, Saudi Arabia: At the CENTCOM Briefing, LTC Mike Gallagher said: "The U.S. Central Command is in the process of evaluating information of on the two salvos of Scud missiles launched by Iraq in Saudi Arabia in the past 24 hours. **We now believe ten missiles were launched, and U.S. Patriot air defense systems shot down nine of them. Iraq fired the first launch of the three Scud missiles into eastern Saudi Arabia at about 9:50 p.m. Saudi time. They were engaged by five Patriot air defense missiles and were shot down near Dhahran. In the second attack, about 12:45 a.m. this morning, January 21st, Saudi time, Iraq fired seven Scud missiles--four at Riyadh, two at Dhahran, and one in the waters off Dhahran. Six of the Scuds were shot down by Patriot missiles. The Scud missile landing in the water did not require engagement. We have no reports of damage or injuries.** The number of Patriot missiles fired at the incoming Scuds in the second set of launches is still not available at this time. All the missiles were thought to be carrying high explosive warheads. Several questions were asked:

Q: "Could you say whether the one which landed in the water actually landed through the help of ... perhaps?"

A: What I understand is it was just in the waters off Dhahran. Because of its trajectory, was the reason it didn't require engagement.

²⁷ Major General Robert B. Johnston, USMC. Jan. 19, 1991 (10:20 a.m., EST). CENTCOM Briefing. Riyadh, Saudi Arabia. Transcript, p. 2.

²⁸ Saudi Press Agency. January 19, 1991. Transcript.

Q: The loud explosion heard in Bahrain, Mike, could that have been the one?

A: I can't say for sure.

Q: Are there any reports of errant Patriot missiles landing in the city here?

A: No, we've not received any such reports, and we've not received any kind of damage reports either.

Q: A number of us saw what appeared to be a missile landing in the southeastern horizon, as viewed from the hotel, landing with a flash on the horizon. I know you may not want to speculate, but would you guess that this could have been either an errant Patriot, or that it could have been a Scud?

A: You're talking about the four in the Riyadh area?

Q: I'm sorry, yes.

A: I can't say what that might have been. But again, just to repeat on those, the ones in the Riyadh area, all four were engaged and destroyed.

Q: Some of us have just seen a crater that looks like it was from a missile or something landing.

A: The question was whether there was a crater. Right now U.S. CENTCOM has not received any such information.

Q: There were some sightings of at least one Patriot that appeared to leave its point and go at a very low altitude horizontally for about a mile and a half, where there is now a large crater and a large building. There are a number of Saudi authorities there. Has anyone from CENTCOM gone out to try to get a damage assessment?

A: I don't have any information on this particular instance, but we'll be glad to take that question for you.

Q: We just got back from this crater, where it blew out the back side of a building and left a hole in the ground about 10 feet deep and about 13-14 feet wide. There were pieces of missile all over the place a mile and a half down the road.

A: We'll take a look at that, and whatever information I can get on it for you, I'll be glad to.

Q: Can you tell us what the Patriot is supposed to do? Is it supposed to decimate in mid-air if it doesn't meet its target?

A: They do have self-destruct systems on them, correct.

Q: So that would be a force if it hit the ground?

A: Yes.

Q: Would a Patriot be capable of causing a crater 10 feet deep and 14 feet wide?

A: I can't answer that for sure. I don't know about the size of the crater.

Q: How much explosives are in a Patriot?

A: I'd have to get the information for you.

Q: Are you sure that there are no Patriots that fell down in town?

A: Right now I don't have any indication. However, it sounds like other people may have some different information. We'll go ahead and take a look at that and try to get that for you.

Q: Can you tell us how you're going about these investigations? Are you actually going to the site? Are you reviewing videotapes? Are you interviewing people in neighborhoods? How are you going about this investigation?

A: We'll use any sources available to us to try to get the right information.

Q: Can I ask how you could have made a mistake in the first place by saying that six Patriot missiles were fired?

A: What we did is we found we had more information, and we wanted to make sure it was right for you.²⁹

The Pentagon: At a press briefing, Pete Williams (Assistant Secretary of Defense for Public Affairs) said: "My purpose here is specifically to try to give you what details we have about the Scud launches into Saudi Arabia this afternoon. Let me caution you all, as I'm sure we'll be doing throughout this operation, that these are preliminary reports. I've hesitated coming down here before now because we wanted to make certain that we had a fairly high degree of confidence in what I'm about to say here. I do want to caution you, appeal to you to note that these are preliminary reports. We continue to go back through this and reassess the event and try to get a better idea of what happened. So again, I want to stress that these are preliminary reports.

Our best information now is that there were two launches of Iraqi Scud missiles toward Saudi Arabia. We believe they were launched from southern Iraq--I can't be more specific than that. **In response, the U.S. fired five missiles...at the incoming missiles. They were fired from the U.S. Patriot batteries near Dhahran. Both the Scud missiles were destroyed, they were both intercepted. Of the five Patriots fired, three of them hit the targets--two of them hit the targets, and one of them may have hit debris. We're not certain about that. It may be that by the time the other two of the remaining five got there, there wasn't anything left to hit.**

I don't have any idea what type of warhead. We have a team out there right now that's trying to assess that. There is, at this point, no reason to believe that they were anything other than conventional, high explosive warheads.

Again, two confirmed Scud launches from southern Iraq. In response, the U.S. fired five Patriot air defense missiles, and both the incoming Scud missiles were destroyed." Several questions were asked, including:

Q: "Did any of the debris fall over populated areas? Was anyone injured?"

A: I have no reports of any injuries or any debris striking anyone.

Q: Can you tell us how close in to Dhahran they were when they were intercepted?

A: No, I don't have that information yet.

Q: There was an air raid warning in Riyadh also. Are there any reports of missiles or any other ordnance fired at Riyadh?

²⁹ LTC Mike Gallagher. CENTCOM Briefing. Jan. 20, 1991 (8:35 p.m., EST). Riyadh, Saudi Arabia. Transcript. pp. 1-2.

A: We have no report of anything getting to Riyadh. It may well be that the decision was made to sound the warning in Riyadh once the launch was detected heading into Saudi Arabia, but I have no evidence that anything got near Riyadh.

Q: Can you confirm that they were aimed at Dhahran?

A: It's very hard to tell precisely where they were aimed. The point is, they got near Dhahran and we shot them both down.

Q: You say three Patriots hit targets and five were fired. Do you have any information...Were they destroyed by U.S. Army personnel in mid-air? What happened to those other two missiles?

A: I don't know what happened to them.

Q: What time did this happen?

A: I don't have a precise time. I'm still checking on that.

Q: What can you tell us about this incident? What does it mean?

A: It means that the Patriot is a very effective system. You heard the report earlier in the operation of an incoming target at Dhahran which was shot down by a Patriot. Here's another example. I think it indicates to us that the Patriot is a good system. It also indicates to us that the U.S. crews manning the Patriots are doing an extremely good job.

Q: Do you have any further explanation for the accidental launches of Patriots yesterday?

A: No, that investigation is continuing. I don't think anybody knows the answer yet.³⁰

JANUARY 21, 1991

Washington, DC: During a CNN interview, Defense Secretary Dick Cheney said: **"we've demonstrated, I think, that a Patriot has significant ability to shoot it [a Scud missile] down."**³¹ Later that morning, Cheney said: **"The Scuds have proven to be a relatively ineffective weapon. The Patriot has dealt with them very effectively. It [the Scud] gets a lot of attention because it's there where everybody can see it as they come into Saudi Arabia or Israel."** In response to the question, "hindsight is perfect, but since we knew going in that keeping Israel out of the war was a high priority, why did we wait until after a Scud attack to supply them with Patriot missiles and U.S. crews", Cheney answered: **"We had arranged last fall to provide them with Patriot missiles. That was a decision the President made some months ago, and then it was a matter of getting the equipment there and getting their personnel trained. But we never before have been in a position where U.S. personnel were on Israeli soil defending Israel. That was a major step, a major decision for the Israeli government to**

³⁰ Mr. Pete Williams, ASD (Public Affairs). Pentagon News Briefing. Jan. 20, 1991 (3:15 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs). pp. 1-2.

³¹ Secretary of Defense Dick Cheney. Interviewed on CNN with Gene Randall. Jan. 21, 1991 (6:35 a.m.). Transcript.

make. Once they made it and accepted our offer, then we moved rather rapidly, within a matter of hours, to provide that capability."³²

Washington, DC: In an interview with Fox Channel 5, Defense Secretary Dick Cheney said: "The fact is, to date it's had almost no impact from a military standpoint. **The Patriots have proven very effective against it. I don't think it's likely to have any significant impact on the outcome of the military conflict**"³³

Riyadh, Saudi Arabia: The Saudi Press Agency reported that a spokesman for the Joint Arab Forces Command said: "**...at 10:00 pm last night two Iraqi Scud missiles were launched at the direction of the eastern province....the two Iraqi missiles were destroyed in the air before reaching their targets by five Patriot missiles....no casualties took place.**"³⁴

Riyadh, Saudi Arabia: Asked during a press conference whether there had been any injuries from missile debris that might have fallen the previous night, Col. al-Rubayan answered: "**There were not any injuries, not even from any broken glass. He also said he didn't know what the white flashes of light were after Patriots had been launched. Answering a question about potential Saudi or American casualties: if Patriots failed, "well, we know this is war and having injuries and death is something expected during war.**"³⁵

The Pentagon: At a briefing, Gen. Kelly said: "**During the past 24 hours, 10 Scuds have been fired at Saudi Arabian installations -- nine were shot down by Patriot missiles, and one Scud landed in the water and was not engaged. Just a little over an hour ago another Scud was launched from southern Iraq, and it landed in the water short of AL-Jubail.**

The Scud campaign is not having a dramatic effect on the conduct of this operation. As you see, **the Patriots are doing a fairly good job in countering it.** All he can do is sort of aim those things at a city. They are absolutely not militarily significant, **so I think that we can accommodate them.**

Q: On the Patriot question, we've been seeing, as you have, the CNN tapes and everything else coming into Riyadh, coming into Dhahran. Is it your

³² Secretary of Defense Dick Cheney. Jan. 21, 1991 (7:09 a.m.). Interviewed on NBC Today with Bryant Gumbel. Transcript. p. 2.

³³ Secretary of Defense Dick Cheney. Interview with Fox Channel 5. Jan. 21, 1991 (7:25 a.m.) Washington. Transcript, p. 1.

³⁴ Saudi Press Agency. January 21, 1991. Transcript.

³⁵ Excerpt of Press Conference. Briefer Col. Ahmed Al-Rubayan. Spokesman, Joint Arab Forces Command. Riyadh, Saudi Arabia. January 21, 1991. Transcript.

impression that those missiles are getting closer, perhaps, than they should? And is there a reason why the Patriots, in theory, could not engage them at longer distances?

A: Kelly: Patriot is a close-in air defense system, so it's engaging those Scuds at the ranges that it is programmed to engage them at. It is a close-in protection system. We don't have a system sitting there that can reach out, and incidentally, the flight time for the Scud is only seven minutes. So from the time we pick it up until the time we can react to it, 7,000 miles from the United States, incidentally, it takes a little time. So I would say the reaction of the Patriots to the Scuds has been fairly spectacular.

Q: A fairly small optimum window, then, to actually shoot with a high degree of assurance on killing them?

A: Kelly: Yes.

Q: Is the Pentagon totally confident now, given that some Scuds appear to have got through the Patriot in Saudi Arabia, one perhaps, at least--

A: Well, no more than one.

Q: But they're totally confident now that a further one will not hit Israel?

A: I think I said the other day, there is no such thing as a fool proof defensive system. The way you phrase your question makes it impossible for me to answer it in the affirmative, but clearly the Patriots have proven themselves to be a very effective system, and it gives us one more method to try to deal with the Scud threat against Israel. It's not the only thing we're doing, but it's another one, and obviously, a very highly effective one.

Q: Can you give more details about the one that Kelly mentioned about an hour and a half ago that fell into the water, and whether Patriots were fired at it?

A: My understanding is that no Patriots were fired at it because it wasn't thought that it was going to go anywhere where it would do any damage.

Q: This happened where?

A: It was fired from southern Iraq and I think he said it landed in Gulf waters near al-Jubail.

Q: How many Patriots missiles have been fired?

A: I think there's another case where we're learning as we go. We were fairly forthcoming early on with precisely the numbers that were fired against every incoming launch of Scuds, and we decided that we'll fuzz it up a little bit, so I don't have a number."³⁶

JANUARY 22, 1991

Riyadh, Saudi Arabia: At the CENTCOM Briefing, Gen. Burton Moore, USAF said "As you are all well aware, last night Patriot batteries in Riyadh and Dahran engaged Iraqi Scud missiles aimed at Saudi Arabia. **Our reports indicate that the batteries in Dhahran successfully engaged two Scud missiles in that area, while a third Scud impacted in waters off the**

³⁶ Lt. Gen. Thomas Kelly, and Rear Admiral Michael McConnell. Pentagon Briefing. Jan. 21, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp 1-6.

coast of Saudi Arabia. In Riyadh, our reports indicated that six Scud missiles were fired -- our patriot batteries successfully engaged all six.

During the engagements at Riyadh there was some collateral damage to a building near Riyadh air base; however, we have no reports beyond that, although preliminary reports suggest that it was debris from an intercepted Scud or possibly a Patriot missile that malfunctioned. We'll get more to you as it becomes available. We have no reports of casualties.

Q: Is the total count 12 Scuds fired last night then? It was 10 with 4 in Riyadh.

A: The report we have is there was a total of 10 Scuds fired last night -- six in Riyadh, two in Dhahran, one off the coast, and one several days ago.

Q: A couple of days ago, two Patriots had been fired unintentionally, as we were told. I know there's a possibility that the damage that happened here because of one of the Patriots. How safe is this operation?

A: I think I would say that the investigation on those two Patriots is ongoing, and I would rather couch it in the context of again, every Scud missile that has been launched at Riyadh or Dhahran has been successfully engaged by a Patriot missile.

Q: General, how many Patriot missiles were fired last night?

A: For operational reasons, I will not answer that question.³⁷

Riyadh, Saudi Arabia: LTC Greg Pepin said: Early this morning, Iraq launched six Scud missiles into Saudi Arabia. Our assessment is that all incoming Scud missiles were either intercepted or destroyed by United States Army Patriot missiles, or impacted harmlessly in unpopulated areas. Saudi authorities are investigating to determine possible damage. U.S. CENTCOM has received no reports of injuries to date. All warheads were believed to be conventional, high explosive ammunition.

Q: It appears from both your briefing and the Saudi briefing, that there were at least three Scud missiles that were not intercepted by Patriot missiles, that this Scud was allowed to land. This is a populated neighborhood.

A: Pepin: I can't comment on what the Saudi Arabian official said, but so far the Patriot system has intercepted all incoming Scuds. Those that were programmed not to impact on the non-populated areas were allowed to proceed. You have to remember that when you have an intercept between a Patriot and a Scud you get large pieces of debris that fall, and you see that debris.

Q: So the Saudis were mistaken, this was the carcass of a Scud that was intercepted?

A: Pepin: I'm not aware of what the Saudis, what they say.

Q: Are you aware whether or not any of Scud missiles have fallen in population centers outside of the Damman and Dhahran area,

³⁷ Major General Burton Moore, USAF. CENTCOM Briefing. Jan. 22, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 1-3.

and outside of Riyadh, or in areas that are not relatively well populated?

A: Pepin: As I said, all Scuds have been intercepted. Those that have been allowed to impact in unpopulated areas have done so, but none have impacted in populated areas.³⁸

Riyadh, Saudi Arabia: The Saudi Press Agency reported that according to an official Interior Department source: "as the result of the destruction of Scud missiles in the air in Riyadh Sunday [Jan. 20] night by Patriot missiles, some splinters fell on a building in Riyadh causing minor injuries for twelve persons....minor damage was caused on the wall of the building and the glass windows."³⁹

Riyadh, Saudi Arabia: At the Joint Arab Forces Command Briefing, Col. al-Rubayan stated: "Iraq fired at least two Scuds at Riyadh early this morning. Both were detected. One was intercepted and destroyed by a Patriot missile over Riyadh City. An investigation is underway regarding the other missile and some possible impact of missile or debris from the missile. The debris will be collected as part of the investigation. Also this morning, Iraq fired at least three Scuds toward the eastern province. They were detected by Patriot batteries. One was intercepted and destroyed. Two were allowed to crash into unpopulated areas. At 2200 last night, Iraq fired one missile toward the eastern province. It was allowed to crash harmlessly into the ocean. There are no reports of injuries or significant damage resulting from either the Riyadh or eastern province Scud incidents...."

Q: A number of us saw a battered Scud missile lying in a Riyadh street. We will not identify where this took place out of--as per the request of your government. Can you tell us exactly why there was a Scud missile lying in the street? Is that the one that was destroyed? Is that the one that is under investigation...?

A: That is the one that is under investigation, it could be part of a Scud missile or a kind of fuel part that falls down during descending. We are not sure of any information yet...

Q: Two nights ago--the Scuds that were launched at Riyadh--do you have any further information about the crater that was formed by some explosion? You said you would give us further information?

A: Unfortunately, up until now, I don't have that information. It is either an explosion of the Patriot on its way down or it is an interception point.

Q: Who is doing the investigation? Is all the coalition forces or the Saudi--

³⁸ LTC Greg Pepin, and Rear Admiral Conrad C. Lautenbacher, Jr. CENTCOM Briefing. Jan. 22, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 1-2.

³⁹ Saudi Press Agency. Riyadh, Saudi Arabia. January 22, 1991. Transcript.

A: It is all the coalition forces beside the civil defense--Saudi civil defense.⁴⁰

The Pentagon: At a briefing, Gen. Kelly was asked:

Q: What about this latest Scud attack on Israel? Apparently one Scud did get through to Tel Aviv despite the arrival of the Patriots. Do you have any preliminary assessment on that?

A: Kelly: That happened within the last couple of hours, and the Israelis are working very hard at it right now. My suggestion would be, at this stage of the game, you would have to go ask them what the specifics are, because we don't know. We're trying to get some information.

Q: Israel has these additional Patriots we sent. The fact that at least one Scud successfully got in, what does that say now about the limitations of the Patriot?

A: Kelly: I don't know, because I'd have to know what the facts were that existed at the time the Scud got in. I simply don't know that. If it got in and landed, then it's obvious that the Patriot didn't get it and that will have to be analyzed and we'll have to try to figure out why that occurred.

Q: Have we obtained any information from those Scuds that have fallen into the water? Are we actually trying to get hold of those Scud missiles?

A: Kelly: I'll have to check on that and get back to you. I just don't know the answer.

Q: Can you talk about the success rates for the Patriots? Have there been any misfires? Or could you characterize it as totally effective?

A: As far as I know, there have been some misfires. I know that a couple of days ago we said that two Patriot missiles had apparently accidentally fired. I think the system is working pretty well. I would caution you all that there is no such thing as a fool-proof defense; there is no such thing as fool proof weapons system. I don't know what the precise percentage figures are or how, indeed, they calculate that for the specific instance of the Patriot system."⁴¹

JANUARY 23, 1991

Riyadh, Saudi Arabia: At the CENTCOM Briefing, LTC Mike Scott said: "First, the issue of the crater that was the result of a recent Scud attack in this vicinity. The analysis of the debris shows both Scud and Patriot remains in the crater. Our analysts indicate the Scud was successfully

⁴⁰ Saudi Press Agency. Press Conference with Col. Ahmed al-Rubayan, Joint Arab Forces Command. Riyadh, Saudi Arabia. Jan. 22, 1991. Transcript.

⁴¹ Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Jan. 22, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp 1-6.

intercepted, most likely at a low altitude. The combined debris then caused the crater and accompanying structural damage. It should be noted that the damage was minimal compared to what would have occurred had the Scud impacted on its own.

Q: Have you discovered how or why two Patriot missiles were launched from here accidentally several days ago?

A: That incident is still under investigation. The answer to your questions is no, we haven't yet.

Q: Then how can you be confident they're 100 percent safe?

A: I'm not aware of any injuries as a result of that inadvertent launching. The Scud missiles have not made it to any target within Saudi Arabia. I think those facts speak for themselves.⁴²

Riyadh, Saudi Arabia: During the Joint Arab Forces Command press briefing, Col. al-Rubayan announced: "A joint Saudi and U.S. committee has been formed to investigate all military questions relating to the Scud attacks and the resulting damage. The committee will, for example, look into the sources of debris. The Saudi Civil Defense Office has ongoing investigation as well, and the two groups will cooperate and exchange information as necessary...."

Q: Colonel, can you say---who are the members of this committee that you just mentioned?

A: It is a joint committee from most of the forces that are represented in the coalition.

Q: Who is in charge of it? Who is the senior man on this committee, then?

A: I really don't know right now. I can bring you this news later....

Q: Have there been any Scud attacks into Saudi Arabia that have not provoked an alarm? Because I was told yesterday there was one in Dhahran and there were eyewitnesses to it, but no alarm went off.

A: There is not any confirmed Scud attack last night.⁴³

The Pentagon: At a briefing, JCS Chairman Gen. Colin Powell was asked:

Q: Who fired the Patriot that apparently hit or didn't hit the Scud that did the damage in Tel Aviv yesterday?

A: IDF. (Israeli Defense Force)

Q: Why did they do it instead of the U.S. crews?

A: Either one could have done it, whoever was in position. The U.S. crew was working with a power problem, a generator problem they had at the time, and IDF got acquisition and fired.

Q: Did that Patriot hit the Scud?

⁴² LTC Mike Scott, CENTCOM Briefing. Jan. 23, 1991 (8:45 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 2-4.

⁴³ Joint Arab Forces Command Press Briefing, with Col. Ahmed al-Rubayan. Riyadh, Saudi Arabia. January 23, 1991. Transcript.

A: I really would prefer to defer to the IDF to comment on their actions. I'm just passing on a report I heard."⁴⁴

JANUARY 24, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, LTC Pepin said: "Now let me address last night's Scud activity. Iraq fired six Scuds last night -- one towards Israel, five towards Saudi Arabia. All six were intercepted. In total, Iraq has fired approximately 22 Scuds toward Saudi Arabia. Of these, 18 were intercepted and 4 were allowed to impact harmlessly in unpopulated areas.

Q: Could you tell us, out of the 22 Scuds fired, how many have been targeted at Riyadh or the Riyadh area? And as a follow up, can you give us the exact number of Scuds fired last night, which was still undetermined when your 12:15 a.m. press release came out?

A: Last night we had six Scuds fired -- one of which was towards Israel, five towards Saudi Arabia. Two of those were towards Riyadh, two were towards Dhahran, and two towards King Kalid Military Center.

Q: That makes six.

A: Just one towards . . .

A: I'm sorry, I meant one.

Q: Are the Scuds getting any closer to populated areas? For example, I heard a rumor that one of the Scuds that came into Riyadh came within 200 feet of a populated area last night. Are they landing closer? And if so, what is the reason for that?

A: The Patriot system is geared to intercept those missiles that are going to land in populated areas. It's geared in the program to allow those Scuds that will not impact in populated areas to go ahead and harmlessly impact. So far, all those Scuds that have been fired towards us have either been intercepted, or have impacted in unpopulated areas -- so I think that kind of speaks for itself, that none of them have impacted in populated areas.

Q: Is 200 feet considered dangerously close, or is that normal?

A: I can't get into semantics -- I can't get into what is a large populated areas compared to a small populated area. So far...

Q: No, 200 feet -- I'm talking about distance.

A: I'll let the statistics speak for themselves. So far we have seen no major injuries or deaths or major damage due to Scuds.

Q: Has the investigation into why two Patriots were unintentionally fired a few days ago yielded any results?

A: They're still trying to figure out what happened in that instance -- we still don't have the results yet.

Q: Can you categorically say there have been no serious injuries as a result of incoming Scuds in Saudi Arabia?

⁴⁴ Secretary of Defense Dick Cheney, and General Colin Powell, Chairman JCS. Pentagon Briefing. Jan. 23, 1991 (2:00 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 15.

A: I can categorically say that there have been no serious injuries due to Scuds in Saudi Arabia, that's correct.

Q: In all these Scud attacks we've had in Saudi Arabia, how many have been taken to the hospital, and how many remain there, if any?

A: I'd have to let you ask the Saudis that. We don't have the information for the civilians."⁴⁵

Riyadh, Saudi Arabia: At the Joint Arab Forces Command press briefing, Col. al-Rubayan stated: "As you probably know, the missiles were fired at Saudi Arabia last night. Targets were Riyadh, the northern region, and the eastern province. The attacks were timed at about 2257 last night. Altogether five Scuds were fired. All were detected, intercepted, and destroyed by Patriot missiles. We have no reports of injuries or significant damage from any of the Scuds knocked from our skies in the last 24 hours."⁴⁶

The Pentagon: At a briefing, ASD Pete Williams said: "The Iraqis have launched five Scuds, confirmed by our sources -- one toward Haifa, which was destroyed by a Patriot; two in the direction of Riyadh, one of which was engaged and destroyed by a Patriot, the other, which did not threaten the area, landed in a non-determined desert area -- no report of impact; and two in Dhahran which were both destroyed by Patriots.

To date, 22 Scuds have been launched in the direction of Saudi Arabia -- 18 of those have been destroyed by Patriots, and 4 have impacted. There have been 13 total Scuds launched toward Israel, and as of yesterday, you know we engaged the first one with a Patriot, it was destroyed.

Q: There are reports that two Patriot missiles were accidentally launched in Turkey. Is that accurate?

A: Brandtner: I have heard that there has been an unintentional launch of Patriot missiles. It's being investigated. We do not know the circumstances at this time.

Q: You know there were no Scuds?

A: I won't speculate on the cause, but it's being investigated in theater, and the results of that are not known at this time."⁴⁷

⁴⁵ LTC Greg Pepin. CENTCOM Briefing. Jan. 24, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 2-8.

⁴⁶ Joint Arab Forces Command Press Briefing. Col. Ahmed al-Rubayan. Riyadh, Saudi Arabia. January 24, 1991. Transcript.

⁴⁷ Pete Williams, MG Martin L. Brandtner, and Capt. David Herrington. Pentagon Briefing. Jan. 24, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp. 1,7.

JANUARY 25, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, MG Robert B. Johnston said: "Going to air defense operations. . . Again, you all know as well as I do, there were no Scud attacks last night and the current count is still 35 -- 22 were fired against Saudi Arabia and 13 at Israel."⁴⁸

The Pentagon: At a briefing, Gen. Thomas Kelly said, "Up until today . . . 34 Scuds had been launched against Saudi Arabia and Israel -- 21 against Saudi Arabia, 13 against Israel. Eighteen of them were destroyed by Patriots, nine landed in uninhabited areas or in the sea. Of the remaining seven, to one degree or another they impacted the earth and caused some damage. Earlier today, about 11:00 our time, an additional seven Scuds missiles were launched against Israel. We don't have final information on what their disposition was. Some indications on the TV, as you know, were pretty good. You'll have to get the final answer from Israel. Somewhat after 2:15 local this afternoon, two additional Scuds were launched towards Saudi Arabia, and I don't, obviously, have the final reports on them now, although the indications are that we did pretty well. When I say I don't have a final, we have to stand behind the numbers we put out, and I have to wait until I get precise reports in.

A: Are the latest Patriot batteries in Israel all from Europe, and are they all American-manned for the time being?

Q: In addition to the ones that the Israelis have already obtained for themselves, and which their crews are studying how to operate; yes, the U.S.-supplied Patriots are all being manned by U.S. crews, and they're all coming out of Europe.

Q: The videos of the latest Scud attack from Tel Aviv looks as if some Patriot missiles are taking off and impacting. Do you know anything about that? Can you shed any light on that?

A: Whether Patriot missiles hit some of those incoming Scuds?

Q: No, it looks as though Patriots are taking off and then crashing and exploding.

A: I've not seen the videotape. Again, let me tell you why it takes awhile to sort through what happens in these Scud attacks. These are things that happen very, very quickly. The Scud comes over, you've heard people describe how quick the trip is, then you have all these events happening in a very short period of time. You have rapidly incoming missiles, you have Patriots going up to hit them - - a lot of things happening very quickly, and it's almost impossible - - especially with cloudy skies -- for observers just to stand there and know what it what and what fell where. So you go back and look through all the data that's gathered during an event like this, from as many different perspectives as you can, and then try to sort out precisely what happened. So it's very, very hard to tell immediately, or within a few hours, even after the event, precisely what happened and what fell where. That takes a long time to sort

⁴⁸ Major General Robert B. Johnston. CENTCOM Briefing. Jan. 25, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 2.

out. In some cases, you never know for certain what exactly, what piece of what fell where. It's very hard to sort that out."⁴⁹

JANUARY 26, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, LTC Mike Scott said: "Now let me address last night's Scud activity. Iraq fired nine Scuds last night -- six of those were directed toward Israel, three of them were sent into Saudi Arabia. All nine were intercepted. However, the warhead of one of the two Scuds that were sent towards Riyadh was not destroyed. Although the Scud was hit, the Patriot didn't directly hit the warhead, it fell to the ground, and subsequently exploded. One civilian was killed; approximately 23 were injured.

This brings the total number of Scuds fired since hostilities began to 45 -- 25 of those have been sent to Saudi Arabia, and 20 were directed at Israel. Of the 25 sent to Saudi Arabia, 18 of them have been intercepted, and 16 of those interceptions resulted in complete destruction of the Scud. Seven of the Scuds sent towards Saudi Arabia were allowed to impact in unpopulated areas.

Q: Has there been an investigation launched into why the Patriot missiles failed to stop the Scud warhead last night?

A: I don't know that there's any big investigation involved in it -- the Patriot did what it was told to do, what the system said it was supposed to do, and that was to hit the missile that was in-bound. Any missile, I don't care whether it's an air-to-air missile that's being launched, or a land-to-land missile, or a missile being launched against a ship, won't necessarily hit it's target, especially in a real dynamic situation like you've had, in the exact spot that we would like it hit. It could have, at the last minute, hit some kind of bump of some sort. There's a myriad of reasons for that. I think the important thing is that it hit the missile. I think the other thing we need to remind ourselves of, there has not been one Scud that has made it into Saudi Arabia that has not been intercepted if we wanted to intercept it.

Q: Could you tell us why the Patriots over Riyadh chase the Scuds south and shoot them down over the city, which seems to be what's happening?

A: You're getting into some technical questions with the Patriot system that I'm afraid I'm not qualified to answer."⁵⁰

Riyadh, Saudi Arabia: At the Joint Arab Forces Command military briefing, Col. al-Rubayan said: "Last night brought new Scuds on Dhahran and on Saudi capital Riyadh. Riyadh was attacked at 10:23 last night. The attack on Dhahran came at 3:29 am today, and triggered alarms in Riyadh as well as

⁴⁹ Pete Williams, Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Jan. 25, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp. 4, 12, 13.

⁵⁰ LTC Mike Scott. CENTCOM Briefing. Jan. 26, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 1-3.

in the eastern province. The one Scud fired at Dhahran and the two fired at Riyadh were intercepted by Patriot missiles and destroyed. Our information is that debris from one of the two Riyadh explosives fell on a government building in the city. It's caused the death of one Saudi citizen and injury to thirty other persons who were from a variety of countries including Saudi Arabia. The incident is under active review by the newly formed committee of Saudi and U.S. investigators. On the ground last night, Iraq fired short-range Frog tactical missiles across the border. The missiles impacted in the Saudi Arabian desert, hitting no one and causing no damage....

Q: The damage that was caused to the building that you cited, do you know yet whether it was caused by the Scud, or by the Patriot or by the combination of both? The actual physical damage to that building?

A: The information that we have that it was debris, and could have been from both missiles.

Q: Why is there such little warning given when a Scud's on its way?...

A: This details goes into the warning and command control system which I really cannot answer....

Q: Where were the people who were injured last night? Were they mostly in one place or were they hit by debris all over the area?

A: They were hit by debris, but not very far.⁶¹

The Pentagon: At a briefing, MG Martin Brandtner said: "In the last 24 hours, prior to the last 24 hours -- prior to the last 15 minutes -- Iraq had launched nine Scuds -- six of them at Israel and three into Saudi Arabia. Of that, eight of the nine were intercepted by Patriot missiles. Within the past 15 minutes or so, we have had four launches detected -- one that was launched into Riyadh and was intercepted by a Patriot missile, and I think you saw that one, probably, and it indicated that there was some debris that did impact into the city. We don't have any more information on that. We also have been advised that three other missiles were launched toward Haifa and one to Tel Aviv. We do not know the outcome of those events at this time, but we do have indications that all were engaged by Patriot missiles.

Q: You said four launches have been intercepted in the last 15 minutes before you came in here -- one at Riyadh, three towards Haifa, and one towards Tel Aviv.

A: Brandtner: If I gave you those numbers, it's one to Riyadh, three to Haifa, and one to Tel Aviv. Five. I'm sorry.

Q: Another question about the Scuds, apparently they are separating in the air, warheads breaking away from the booster, which makes it even more difficult for the Patriots to intercept. Can you tell us about the difficulties this poses to the Patriots? And also, if you believe there are a sufficient number of Patriots in theater to deal with the Scud threat?

⁶¹ Joint Arab Forces Command Military Briefing, with Col. Ahmed al-Robayan. Riyadh, Saudi Arabia. January 26, 1991. Transcript.

A: Brandtner: I'll answer your second question first, and say yes. And secondly, we look at all the operational parameters of the weapons system, and we're constantly evaluating its performance. We will make sure that it works right, and it is working right. The remarkable success record of the Patriot stands on its own.

Q: A lot of times the boosters are falling to ground and causing a lot of damage on their own.

A: Brandtner: There is debris that comes from the impact of a missile, and how the missile breaks up once it's been impacted, I think is a chance event. The missile is being struck by the Patriot as intended. Things come out of the sky when you have an impact like that, and you just can't control what comes out as a result of that.

Q: I'm talking about prior to impact by the Patriot, as they're breaking apart.

A: I can't address that.

MG Brandtner said: "Before I go here, let me tell you that we have the Joint Staff giving us the most current information on the Scuds, to try to keep it straight. Three Scuds into Tel Aviv, one into Haifa -- not as may have been said earlier.

Q: As a sort of summation, now that you get the latest on Scuds, can you sum up today's attack, sort of spelling it out?

A: I don't know that I have a great deal to add to what was said earlier. The best information that we have, as of 4:15 Eastern time on Saturday, is that three Scuds were fired into Tel Aviv and one into Haifa. I don't know the extent of the damage.

Q: Do you know if they were intercepted?

A: I think Gen. Brandtner has already addressed that, and I don't have anything further on that."⁵²

JANUARY 27, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Norman Schwarzkopf said: "As far as air defense activities are concerned, I'm sure you know that to date the Iraqis have fired 51 Scud missiles -- 26 at Saudi Arabia and 25 at Israel. The most recent attack was last night at about 10:48 local time. I don't think I need to tell anybody here that we took one Scud missile in Saudi Arabia from southern Iraq, and five Scud missiles were launched against Israel from western Iraq. The Patriot battery at Riyadh, of course, did kill the incoming Scud missile here; and preliminary reports indicate the Patriot missiles also killed all five incoming in Israel yesterday."⁵³

⁵² Lt. Gen. Thomas Kelly, MG Martin Brandtner, and Capt. David Herrington. Pentagon Briefing. Jan. 26, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, pp. 2-3, 6, 13.

⁵³ General Norman Schwarzkopf. CENTCOM Briefing. Jan. 27, 1991 (12:10 p.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

Riyadh, Saudi Arabia: At the Joint Forces Command military briefing, Col. al-Rubayan stated: "There was a single Scud attack on the Saudi capital. At about 10:48 last night, the Patriot was intercepted and destroyed over Riyadh by a Patriot. The debris fell in an empty field and there were no casualties...."

Q: On the Scud last night, the television film showed the explosion on the ground. Was that the warhead?

A: It was the debris of either one or both....Either the Scud or the Patriot or the debris from both as a result of intercept of the warhead. I don't think it hit.

Q: Well, all of us, I think, are glad the Patriots are picking off these Scuds that are coming into Riyadh. We are seeing debris of warheads falling either near the city or in the city. How concerned are you that if they were to send a Scud with a chemical warhead that it could drop chemical weapons, even if it's intercepted by a Patriot, drop chemical weapons into the city?

A: We are in a war and we should plan for the worst. We hope that they don't have the capability to do that, but if they did, our citizens and almost everybody here in the Kingdom has been provided with the protective measure."⁵⁴

JANUARY 28, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Pat Stevens said: "Last night, as many of you probably noted, we had no Scuds fired, so our total to date remains the same of 26 towards the Kingdom of Saudi Arabia; and 25 towards Israel -- for a total to date of 51."⁵⁵

The Pentagon: At a briefing, Gen. Thomas Kelly said: "I was going to tell you that there were no Scuds launched in the last 24 hours, but at 12:55 a Scud was launched toward Riyadh, and it was destroyed by Patriot missiles. Then at 1404, a Scud was launched from western Iraq towards Tel Aviv. We don't have complete information on that yet, but it appeared to have landed short -- in other words, landed somewhat east of Tel Aviv. We're still trying to develop more information on it."⁵⁶

Huntsville, Alabama: Gen. Robert Drolet, program executive officer for air defense systems (and over the Army Patriot program), said of Patriot's

⁵⁴ Joint Arab Forces Command Military Briefing. Col. Ahmed al-Rubayan. Riyadh, Saudi Arabia. January 27, 1991. Transcript.

⁵⁵ Brig. Gen. Pat Stevens. CENTCOM Briefing. Jan. 28, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 2.

⁵⁶ Pete Williams, and Lt. Gen. Thomas Kelly. Pentagon Briefing. Jan. 28, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1.

performance in Desert Storm: "No one designs for 100% and so far that is close to what we are achieving."⁵⁷

JANUARY 29, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Stevens said: "We noted two Scud firings last night -- one towards Riyadh which was intercepted and destroyed, and one towards Israel. Our total to date is 53 -- 27 towards Saudi Arabia, and 26 towards Israel.

Q: In last night's Scud attack on Tel Aviv, it appeared that the incoming Scud was not intercepted by a Patriot missile. Why were no Patriots fired at that Scud last night?

A: I'm not sure I understood the question. You said the Scud coming here?

Q: On Tel Aviv.

A: I'd prefer not to comment on anything outside the theater of operations, and ask you to take that question over there."⁵⁸

Riyadh, Saudi Arabia: At the Joint Arab Forces Command military briefing, Col. al-Rubayan said: "As you know if you were in Riyadh last night, a single Scud was fired toward the capital at about 9:00 p.m. As with the other launches, it was detected, intercepted and destroyed by Patriot missiles. The debris fell on a farm at the edge of the town. We have no reports of injuries or damages."⁵⁹

The Pentagon: At a briefing, Gen. Thomas Kelly said: "As you know there were two Scuds launched yesterday -- one at Riyadh, which was destroyed by a Patriot missile; one aimed for Tel Aviv, but landed short. As a matter of fact, it landed on the West Bank, fortunately, in an open field, so to my knowledge there were no casualties. It landed between an Israeli and an Arab village. However, we have no Scuds to report to you today, and that's good news."⁶⁰

January 30, 1991

Riyadh, Saudi Arabia: At the CENTCOM Briefing, Gen. H. Norman Schwarzkopf said: "As I told you before, I think Scuds are militarily insignificant....As you know, the total Scud launches have been 53--27 against

⁵⁷ Aviation Week and Space Technology. January 28, 1991. p. 34.

⁵⁸ Brig. Gen. Pat Stevens. CENTCOM Briefing. Jan. 29, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp 1, 6.

⁵⁹ Joint Arab Forces Command Military Briefing. Col. Ahmed al-Robayan. Riyadh, Saudi Arabia. January 29, 1991. Transcript.

⁶⁰ Pete Williams, Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Jan. 29, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1.

Saudi Arabia and 26 against Israel. I think it's significant, however, that in the first week they launched 35 and in the second week they launched 18. I like to feel that we're doing some good.

... and the Patriot's success, of course, is known to everyone. It's 100 percent--so far, of 33 engaged, there have been 33 destroyed.

We have never said there won't be any civilian casualties. What we have said is the difference between us and the Iraqis is we are not deliberately targeting civilians--that's the difference. There are going to be casualties--unfortunately, that's what happens when you have a war. But we are certainly not deliberately targeting civilians, we never have and we have no intention of doing it in the future. Our enemy certainly is, and I hope that's obvious to everybody in this room since you've been under Scud attack.⁶¹

Slides provided by the Pentagon the same day of Gen. Schwarzkopf's briefing showed that (to date) 33 Scuds had been engaged and intercepted by Patriot missiles.⁶²

JANUARY 31, 1991

Riyadh, Saudi Arabia: At the CENTCOM briefing, Gen. Pat Stevens, IV, (USA), said that "for the second consecutive night, the Iraqis did not launch any Scud missiles. The total number of Scuds fired to date remains at 53."⁶³

The Pentagon: At a press briefing, ASD Pete Williams said "there have been a total of 54 Scuds launched. Previous to about 11:56 today there had been none launched since the 28th. However, at 11:56 local time, one was launched towards Israel. It landed 15 miles southeast of Tel Aviv. **I don't have any indication that any damage was done. One Scud.**

Q: You indicated 54 Scuds have been launched--a number of those have been knocked down. How many Patriots is it taking to knock down each Scud?

A: Kelly: We don't discuss the number of Patriot missiles we fire. We have adequate Patriot missiles to do the job. The Patriot has been preeminently successful. I think of 33 Scuds engaged by Patriot, 33 have been hit, so we're very, very happy with the performance of Patriot. The engagement ratios are satisfactory.

Q: We heard a report of five to seven per Scud hit.

A: Kelly: I don't know where you get that, and it's not my report. As I said, I'll stick with the information I gave you."⁶⁴

⁶¹ Gen. H. Norman Schwarzkopf. CENTCOM Briefing. Jan. 30, 1991 (1:00 p.m. EST). Transcript.

⁶² War in the Gulf: The Pentagon's View. The New York Times International. Jan. 31, 1991, p. A12.

⁶³ Brig. Gen. Pat Stevens, IV, USA. CENTCOM Briefing. Riyadh, Saudi Arabia. Jan. 31, 1991 (10:00 a.m. EST). Transcript. p. 3.

⁶⁴ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Rear Adm. Mike McConnell, USN. Pentagon Briefing. Jan. 31, 1991 (3:30 p.m.). News Briefing. Office of the Assistant Secretary of Defense (Public Affairs).

FEBRUARY 1, 1991

Riyadh, Saudi Arabia: In the CENTCOM briefing, Gen. Pat Stevens stated: "for the third consecutive night, the Iraqis did not launch any Scud missiles toward Saudi Arabia. However, they did fire one Scud towards Israel. This brings the total number of Scuds fired to date to 54, which is 27 to Saudi Arabia and 27 towards Israel. During the last week there has been a marked decrease in Scud activity which we attribute to the effectiveness of the nightly Air Force Scud-buster missions."⁶⁵

The Pentagon: During a press briefing, Gen. Kelly noted that "fifty four Scuds have been launched so far, the last one at 11:56 local time yesterday, against Israel. Great news today--as of the time that we came down here, no Scuds had been launched today."

In response to a question about Scud launches into Israel, Gen Kelly said that "I am going to defer to the Israeli Government for specific information on Scud launches into Israel in terms of where they went and how they were engaged by the Israeli Defense Forces."⁶⁶

FEBRUARY 2, 1991

Riyadh, Saudi Arabia: During the CENTCOM briefing, Gen. Johnston said: "As you recall, we've had some 54 Scuds fired--27 to Israel, and 27 towards Saudi Arabia. In the first week of the campaign we had some 35 Scuds fired; the second week it was down to 18; and as you know, the last three days there has been only one firing, and that was from western Iraq towards Israel."⁶⁷

The Pentagon: At a news briefing, Gen. Kelly noted: "On the Scuds, there were none at all yesterday, however, at 1324 this afternoon, 1:24 p.m., one was launched toward Israel. We don't have any results of an impact on that Scud, and I would suggest you ask the Israelis about it. But because we have no results, there's a possibility that it wasn't too effective."

Q: On this latest missile attack, do you know little about it because the missile landed in the West Bank, and does the shortfall indicate to you that the Iraqis are repositioning their launchers because of coalition air attacks against them?

A: I'm not sure of that, and I'm not sure where the missile landed. We don't have that information yet. I would suggest if you need to get that information you should ask Israel because they're the ones that have all the information on what's going on in their country.

⁶⁵ Brig. Gen. Pat Stevens, IV, USA. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 1, 1991 (10:00 a.m. EST). Transcript. p. 2.

⁶⁶ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Rear Adm. Mike McConnell, USN. DoD News Briefing. Feb. 1, 1991 (4:10 p.m.). pp. 1, 13.

⁶⁷ Maj. Gen. Robert B. Johnston, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 2, 1991 (11:30 a.m. EST). Transcript. p. 1.

We think we're enjoying success against the Scuds in the east and the west.

Q: During the last Scud attack that the General just mentioned today, were Patriot missiles fired?

A: We are going to leave all those questions about Scud attacks toward Israel up to the Israeli Defense Forces to answer, because it's basically their operation over there.⁶⁸

FEBRUARY 3, 1991

Riyadh, Saudi Arabia: At the CENTCOM briefing, Gen. Johnston said: "We had, as you all know, again, some Scud attacks. Last night there were three fired--two towards Israel from western Iraq. The first one, and I'll give you approximate times, about 2100 last night. **It did impact in Israel. There was no damage, and there were no Patriots fired--again, because of the lack of proximity to the vital areas in Israel.** The second one which went off some hours later, about 0230 give or take a few minutes, appears that it may have landed in Jordan.

We had one last night that, as you know, was fired at Riyadh. A Patriot did intercept that missile. While there appears to have been some damage on the ground--which I think is inevitable when you see the kind of debris that must ultimately hit the deck--I can't give you the details on the damage. We know some buildings were damaged and the Saudis, I believe, are trying to assess the full impact of that, the residual part of the missile falling to the ground. But a Patriot did engage it.⁶⁹

Riyadh, Saudi Arabia: At the Joint Arab Forces Command briefing, Col. al-Rubayan said: "Shortly before 1:00 this morning, a singular Scud was detected, heading towards Riyadh. **It was intercepted and shot down by a Patriot missile. The wreckage crashed into a city suburb, hitting a residential area and injuring 29 persons of several nationalities.** The injured were 14 Saudis, three Yemenese, six Jordanians, four Syrians, one Kuwaiti, and one Pakistani. Women and children are included in these numbers. All the injured were treated at Saudi medical hospital and all have been released."⁷⁰

⁶⁸ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Rear Adm. Mike McConnell, USN. DoD News Briefing. Feb. 2, 1991 (3:30 p.m.). pp. 4, 10.

⁶⁹ Maj. Gen. Robert B. Johnston, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 3, 1991 (12:20 p.m. EST). Transcript. p. 3.

⁷⁰ Joint Arab Forces Briefing, with Col. Ahmed al-Robayan. Riyadh, Saudi Arabia. February 3, 1991. Transcript.

FEBRUARY 4, 1991

The Pentagon: At a press briefing on the FY92-93 defense budget, Secretary Dick Cheney addressed SDI. He said, "I can't think of a better argument for the need to address the question of dealing with the ballistic missile threat than watching the nightly Scud attacks against Tel Aviv and Riyadh. The fact of the matter is, future Secretaries of Defense are going to have to be able to deploy defenses against ballistic missiles. Whether this is the kind of theater threat we face today where our forces and our friends in the region are threatened by Saddam Hussein's Scud and Scud variants, or far more sophisticated threats we anticipate in the future, the SDI is where those programs are located that are going to allow us ultimately to fill that requirement. SDI is very important; it remains a high priority item for the Department and the Administration....we'll push very hard to persuade Congress to allow us to proceed with developing the capability to deal with this ever-increasing threat.

.... I would expect that we'll be studying the lessons learned from this conflict for a good many years to come....But I think as we go through the debate this year, we will provide that information to the Congress as it comes up. But with respect to the Patriot and Scuds, of course we've been arguing for some time now, some of us, that we needed to be able to defend against ballistic, and we think that's still valid. What we've had is visible evidence that in fact ballistic missile is a threat, even if it's old, out-moded system like the Soviet-made Scud fired by the Iraqis."⁷¹

FEBRUARY 5, 1991

Riyadh, Saudi Arabia: At the CENTCOM briefing, Gen. Johnston noted: "we had no Scuds fired last night, and I would make a point that we did not attack any Scud sites."⁷²

The Pentagon: At a news briefing, Gen. Kelly noted that, "in terms of Scuds, 57 have been launched to date. It's interesting to note that in the first week 35; second week 18; and so far this week, four, and the four that were launched this week were ineffective."⁷³

⁷¹ Secretary of Defense Dick Cheney. News Briefing on the FY 92 Defense Budget. Feb. 4, 1991. Transcript. Office of the Assistant Secretary of Defense (Public Affairs). pp. 7-8, 12.

⁷² Maj. Gen. Robert B. Johnston, USMC. CENTCOM Briefing, Riyadh, Saudi Arabia. Feb. 5, 1991 (12:15 p.m. EST). p. 2.

⁷³ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David Herrington, USN. DoD News Briefing. Feb. 5, 1991 (3:30 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs). p. 1.

FEBRUARY 7, 1991

House Armed Services Committee: In presenting the FY 1992 defense budget, Secretary Dick Cheney said: **"Another lesson I think that comes out of the Gulf War is the importance of defending against ballistic missile attacks. You cannot, in my opinion, sit here and watch the Scuds fly at Tel Aviv and Riyadh and not be concerned that we have to have a way to develop the capacity and field the capacity to deal with ballistic missiles.**

Whether it is the Scud, a relatively cheap, crude system which the Patriot has admirably performed very well against, or whether it is the far more robust ballistic missile threat we see developing out there...future secretaries are going to require the capacity to deploy forces to defend against ballistic missiles."⁷⁴

In his prepared statement, Gen. Colin Powell, Chairman of the Joint Chiefs of Staff, added: **"Patriot missiles deployed in Saudi Arabia and other countries have also done the job in rendering the Scud missile strikes less effective."**⁷⁵

FEBRUARY 8, 1991

Riyadh, Saudi Arabia: At the daily CENTCOM briefing, Gen. Johnston said: **"As you all know as well as I, last night we had one Scud attack. That was intercepted by the Patriot. The warhead was detonated in the air, and all that fell to the ground was some inert Scud debris in a parking lot, with no injuries.** That brings our total Scud count now to, I believe it's 58--a pretty equal balance between those fired at Israel and those fired at Saudi Arabia. That, as I recollect again, it was 35 week one; 18 week two; four in week three; and then we've had one so far in the beginning of week four for Operation Desert Storm."⁷⁶

Riyadh, Saudi Arabia: At the Joint Arab Forces news briefing, Gen. Khalid bin Sultan answered the following question:

Q: The success of the Patriot missiles against the Iraqi Scud missiles has been rather remarkable. Could you comment, if you would please, sir, on the tactical or strategic effectiveness of the Scuds if the Patriot's had not been here? In other words, what--how do you think the Saudi nation would have responded to a prolonged missile barrage in its cities and in its industrial centers?

⁷⁴ U.S. Congress. House. Committee on Armed Services. Hearings before the House Armed Services Committee on the National Defense Authorization Act for Fiscal Years 1992 and 1993. 102d Congress, 1st Session. Washington, G.P.O., pp. 16-17.

⁷⁵ Ibid., p. 51.

⁷⁶ Maj. Gen. Robert B. Johnston, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 8, 1991 (11:30 a.m. EST). Transcript. p. 2.

A: Well, as an old air defense officer, you know, I'm so proud of what the Patriot was doing. But, you know, I personally expected that in '74 when I visited--when it used to be called SAM-D...But from what would be my assessment if the Patriot's is here, we said it many, many times. These type of Scud missiles, it has no effect for military actions or military success, it just has psychologically for effectiveness in civilian's minds and psychological warfare. So from a military point of view it has no importance to us whatever."⁷⁷

The Pentagon: At a news briefing, Gen. Kelly noted: "On the Scuds, 58 have been fired so far. As you know around 1600 last night, a Scud was launched towards Riyadh. It was intercepted by a Patriot and destroyed. The box score so far is 35 the first week; 18 the second week; four the third week; and one so far this week. There have been no Scuds launched against Israel since last Saturday (Feb. 2, 1991)."⁷⁸

FEBRUARY 9, 1991

Riyadh, Saudi Arabia: At the CENTCOM briefing, Gen. Richard Neal said: "as you all know, early this morning one Scud was fired towards Israel. It was intercepted by a Patriot battery located in Israel. Some Scud debris did land in Tel Aviv, and as you know, I think there were some casualties associated with it....Total Scuds fired to date stands at 59 after last night, so one single event."⁷⁹

FEBRUARY 10, 1991

Riyadh, Saudi Arabia: At the daily CENTCOM briefing, Gen. Neal noted: "again, as you know, there have been no Scud attacks during this past 24 hours. I think we can attribute that to an active and aggressive air campaign over the suspected Scud areas."⁸⁰

FEBRUARY 11, 1991

The Pentagon: At a news briefing, Gen. Kelly noted "the Scud launch now is, I think 61. We had two additional that were launched today--one launched

⁷⁷ Joint Arab Forces Middle East Daily News Briefing. Lt. Gen. Khalid bin Sultan. Riyadh, Saudi Arabia. February 8, 1991. Transcript.

⁷⁸ Mr. Bob Hall, DASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David L. Herrington, USN. DoD News Briefing. Feb. 8, 1991 (3:30 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs).

⁷⁹ Brig. Gen. Richard I. Neal, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 9, 1991 (10:00 a.m. EST). Transcript. p. 2.

⁸⁰ Brig. Gen. Richard I. Neal, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 10, 1991 (10:00 a.m. EST). Transcript.

towards Israel at 1154, and one launched towards Saudi Arabia at 1421. **The one launched towards Saudi Arabia, which we, of course, have more information about, was intercepted by Patriot and killed. No damage reported. You have to check the Israelis for the results of the Scud launched there. The score per week is 35 the first week; 18 the second week; four the third week; and so far in the fourth week, four.**⁸¹

FEBRUARY 12, 1991

Riyadh, Saudi Arabia: At the CENTCOM briefing with Gen. Neal, he said: "Unfortunately, as you all know, a Scud last night--we had three Scud firings last night, two towards Israel and one towards Saudi Arabia. **There was some minor property damage done north of the city of Riyadh, and there were two minor injuries.** I think the Saudi briefer will probably cover that in more detail.

Q: Can you explain why the Scud attacks have been on Riyadh, and not on Dhahran?

A: Obviously, I can't get inside the mind of the Iraqi missileers. I would think that our air campaign plays a significant role in where they are firing and how they are firing. In other words, the number of missiles they're firing, and then where they're firing. Obviously, there's probably more political capital to be made as a result of attacking Riyadh and doing some type of substantial damage."⁸²

Riyadh, Saudi Arabia: At the Joint Arab Forces Command news briefing, Col. al-Rubayan said: "**Last night, as you know, an Iraqi Scud missile aimed at Riyadh was intercepted and destroyed by a Patriot missile. Debris fell on the suburbs of Riyadh and broken glass slightly injured two guest workers in the Kingdom, an Egyptian and an Indian....**

Q: Can you tell us more about the Scud, where it hit?

A: I cannot talk about the exact location. It was north of Riyadh.

Q: What kind of place did it hit?

A: A back yard."⁸³

The Pentagon: Gen. Kelly noted that "to date there have been 62 Scuds launched--32 against Israel and 30 against Saudi Arabia. As you know, yesterday there were three Scuds launched--all times Eastern Standard--one at 1154, one at 1421, and one at 1824. The one at 1421 was launched against Saudi Arabia. **None of the three of them did a great deal of damage.** The

⁸¹ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David Herrington, USN. DoD News Briefing. Feb. 11, 1991 (4:05 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs). p. 2.

⁸² Brig. Gen. Richard I. Neal, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 12, 1991 (10:00 a.m. EST). Transcript. pp. 1, 6.

⁸³ Joint Arab Forces Command Military Briefing. Col. Ahmed al-Robayan and Lt. Col. Ayed al-Jeaid. Riyadh, Saudi Arabia. February 12, 1991. Transcript.

box score by week is 35 for the first week; 18 for the second week; four for the third week; and so far in the fourth week, five."⁸⁴

FEBRUARY 13, 1991

The Pentagon: Gen. Kelly stated that "there were no Scuds launched over the past 24 hour period: 62 have been launched to date--32 towards Israel and 30 towards Saudi Arabia."⁸⁵

FEBRUARY 14, 1991

Riyadh, Saudi Arabia: At the Joint Arab Forces Command briefing, Col. al-Rubayan stated: "At 11:45 this morning, a Scud missile launch was detected in central Iraq. Two Scuds heading toward targets in the northern part of the Kingdom broke up in flight. There was no engagement of these Scuds from Patriot missile batteries. Debris from the two Scuds fell into the vicinity of Hafr al-Batin. Three cars were set on fire. One civilian home was destroyed and a commercial workshop damaged. Four civilians were slightly injured...."

Q: ...do you have any idea why this Scud was fired in broad daylight? Does this show some Iraqi capability that we didn't know about and does that concern you that they're able to fire in broad daylight?

A: I really have no idea why it was fired during the daylight. But it doesn't matter, no, because the effects of those Scuds, we have noticed here in Riyadh and there, even there when it landed, it was broken up into five pieces, some of them landed in the desert. And the effect is not feasible to affect a military operation....

Q: Col., you said it broke up in flight. Yet the damage that you've described sounds like it was quite severe. What size were these pieces when they came down?

A: I really have no exact information, although we have an eye witness sitting here.

... (Col. al-Jeaid): I haven't seen the size, but I was there at the northern area this morning and I met some of the ---of our commanders who went to the site. But it was not in a populated area, it was close to some of the area. But the damage as--exactly as it was announced here. We are giving the real facts and the real numbers.

Q: Did the warhead fall?

A: I really cannot confirm or deny the warhead, but as far as I was talking to the people who went there to the site and it was not

⁸⁴ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Rear Adm. Mike McConnell, USN. DoD News Briefing. Feb. 12, 1991 (3:30 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs). p. 3.

⁸⁵ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David Herrington, USN. DoD News Briefing. Feb. 13, 1991 (3:30 p.m.). Transcript. Office of the Assistant Secretary of Defense (Public Affairs). p. 1.

really a significant influence to the--either to the forces or to the populated area to the north.

Q: The American briefer said that there were Patriot batteries in that area, but why were the Patriots not shot at this Scud?

A: As far as this, ultimately it was going apart in the air. I don't think there is--you know, this is from just the Patriot point of view. I don't think it will go and engage. But again, I'm not going to discuss, you know, the position of the Patriot or the--or why it doesn't engage. But it does not engage and it does not--I mean, it doesn't go against the Scud. So the Scud was in a non-populated area. . . . the slightly injured are Saudis."⁸⁶

The Pentagon: Gen. Kelly said: "To date there have been 64 Scuds fired. As you know, two were fired yesterday towards Hafgar Al Batin. They were not intercepted by a Patriot because they weren't in a Patriot fan, and they fell to earth causing only minor damage. The box score now is 35 for the first week; 18 for the second week; four for the third week; and seven for the fourth week.

Q: ...the Scuds launched last night were of lesser quality than the ones we have seen recently...

A: Kelly:They appeared to break up upon reentry into a number of pieces. It didn't look like the best work in the world--as a matter of fact, those that were successful didn't look like the best in the world, either."⁸⁷

FEBRUARY 15, 1991

Riyadh, Saudi Arabia: The Saudi Press Agency reported: "The workshop destroyed by parts of Scud missiles launched by the enemy towards Hafrul Battin on Thursday [Feb. 14] was a civilian one for car maintenance. All Scud missiles being launched by the enemy are being detected whether at day or night."⁸⁸

Riyadh, Saudi Arabia: Gen. Neal noted "there were no Scuds fired during this past 24 hours....For those that keep tabs, that still remains a total of 64 Scuds that have been shot against either Saudi Arabia or Israel."⁸⁹

⁸⁶ Joint Arab Forces Command News Briefing. Col. Ahmed al-Robayan and Col. Ayed al-Jeaid. Riyadh, Saudi Arabia. February 14, 1991 (11:00 EST). Transcript.

⁸⁷ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David Herrington, USN. DoD News Briefing. Feb. 14, 1991 (3:30 p.m.). Transcript. Office of Assistant Secretary of Defense (Public Affairs). pp. 1, 8.

⁸⁸ Saudi Press Agency. Riyadh, Saudi Arabia. February 15, 1991. 1900 GMT Transmission. Transcript.

⁸⁹ Brig. Gen. Richard I. Neal, USMC. CENTCOM Briefing. Riyadh, Saudi Arabia. Feb. 15, 1991 (10:30 a.m. EST). Transcript. p. 2.

The Pentagon: Gen. Kelly said "there were no Scuds fired within the last 24 hours. Total to date is 64...."

Q: Can you elaborate on the procedure of upgrading the Patriot both here in the United States and in Israel, regarding the performance of the Patriot both in Israel and Saudi Arabia?

A: Upgrading the Patriot beyond the PAC II missiles that Israel has now?

Q: Upgrading the ability of the Patriot.

A: **The Patriot, I think, has performed pretty well. We are always interested in improving the performance of any of our weapon systems, and I'm sure there will be a continual process of appraisal of how well the Patriot's done. But I think our assessment is that the Patriot has performed quite satisfactorily so far. Can any system be made better? Yes.**⁹⁰

FEBRUARY 16, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, One Scud was fired last night into eastern Saudi Arabia near the port city of Al Jubayl, about 2:00 a.m. this morning. The Scud appeared to break up in flight, and it landed in the Arabian Gulf. There were no Patriots fired in response to the Scud launch.

To date, 65 Scuds have been fired by Iraqi forces.⁹¹

Riyadh, Saudi Arabia: At the Joint Arab Forces Command military briefing, Col. al-Rubayan stated: "At 2:00 this morning a single Scud missile was launched again at Saudi Arabia. The Scud landed without effect in the Arabian Gulf, east of Al Jubail. There was no engagement of Patriot missiles. This Scud was the 33rd launched by Iraq towards Saudi Arabia."⁹²

The Pentagon: At a Pentagon briefing, Gen. Thomas Kelly said: "Scuds -- there were two launched today, at 1313 and 1314 towards Israel. My understanding is the damage was light, but you'll have to contact the Israelis to get more specifics on it. That means we have 67 fired to date, -- 34 towards Israel and 33 towards Saudi Arabia. The box score by the week is 35 the first week; 18 the second week; four the third week; five the fourth week;

⁹⁰ Mr. Pete Williams, ASD (Public Affairs), Lt. Gen. Thomas Kelly, USA, and Captain David Herrington, USN. DoD News Briefing. Feb. 15, 1991 (3:30 p.m.). Transcript. Office of Assistant Secretary of Defense (Public Affairs). p. 14.

⁹¹ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 16, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 2.

⁹² Joint Arab Forces Command Military Briefing. Col. Ahmed al-Robayan. Riyadh, Saudi Arabia. February 16, 1991. Transcript.

and five so far this week. As you may have noted, recently the Scuds have not achieved a great deal of damage."⁹³

FEBRUARY 17, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "In Scud reporting, last night Iraq launched two Scud missiles at Israel. It appears they were fired towards Haifa and Tel Aviv. We have no information on injuries or damage sustained. I must report that coalition fighters were in the general vicinity of Scud launch For those keeping track, this brings us to a total of 67 Scuds fired to date."⁹⁴

FEBRUARY 18, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "There was no Scud activity last night For those that keep track, total Scuds fired to date remains at 67."⁹⁵

Andover, Mass.: In a visit to the Raytheon [Patriot] Missile plant, President Bush said: "The critics said that this system [Patriot] was plagued with problems, that results from the test range wouldn't stand up under battlefield conditions. You knew they were wrong--those critics--all along. And now the world knows it, too. Beginning with the first Scud launched in Saudi Arabia--and the Patriot that struck it down--and with the arrival of Patriot battalions in Israel, all told, Patriot is 41 for 42--42 Scuds engaged, 41 intercepted....No, I'm sure that some experts would say Patriot's not perfect. No system is; no system ever will be. Not every intercept results in total destruction. But Patriot is proof positive that missile defense works."⁹⁶

⁹³ Pete Williams, Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Feb. 16, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1.

⁹⁴ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 17, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

⁹⁵ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 18, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

⁹⁶ Remarks to Raytheon Missile Systems Plant Employees in Andover, Massachusetts, Feb. 15, 1991. Weekly Compilation of Presidential Documents, Vol. 27, No. 7, Monday, February 18, 1991, p. 178.

FEBRUARY 19, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "There were no Scuds fired last night Total Scuds fired to date remains at 67."⁹⁷

The Pentagon: At a Pentagon briefing, Gen. Kelly said: "There was one Scud fired in the past 24 hours, for a total of 68. **That one was fired towards Tel Aviv in Israel. It went off at 12:52 Washington time. I don't have any indication of what the results were. However, we also haven't had any indication of serious damage.** The box score now would be 35 the first week; 18 the second week; four the third week; five the fourth week; and six for the fifth week."⁹⁸

FEBRUARY 20, 1991

House Armed Services Committee: In testimony, U.S. Army Secretary Stone said: "**The Patriot has been a great success, and I think it is a tribute to a lot of things.** It is a tribute to, of course, the emphasis on technology, which we all think is important. I think it is a tribute to the support we have received through some difficult times from Congress, because in the early 1980s, 8 or 10 years ago, the system was having some problems, as systems do from time to time....**we have met [the missile threat in Iraq] successfully, but there are improvements that we could make....[one of which] is the Patriot missile itself.**"⁹⁹

FEBRUARY 21, 1991

Senate Armed Services Committee: In presenting the FY 1992 and 1993 defense budget, Defense Secretary Cheney said: "A second implication for future regional conflicts that clearly emerges from the current crisis is the military and political importance of enhancing defenses to counter missile proliferation. **Patriot missiles have demonstrated the technical efficacy and strategic importance of missile defenses.** This underscores the future importance of

⁹⁷ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 19, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

⁹⁸ Pete Williams, Lt. Gen. Thomas Kelly, and Capt. David Herrington. Pentagon Briefing. Feb. 19, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1.

⁹⁹ U.S. Congress. House. Committee on Armed Services. Hearings before the House Armed Services Committee on the National Defense Authorization Act for Fiscal Years 1992 and 1993. 102d Congress, 1st Session. Washington, G.P.O., p. 157.

developing and deploying a system for GPALS, to defend against limited missile attacks, whatever their source."¹⁰⁰

In response to questions from Sen. John Glenn about lessons learned in the Gulf War, Cheney stated: **"Our Patriot missiles have been very successful against the Scuds."**¹⁰¹ To a question about SDI from Sen. Dan Coates, Secretary Cheney answered: **"Defenses against tactical ballistic missiles work and save lives. The effectiveness of the Patriot system was proved under combat conditions. Our defense policy needs to place greater focus on evolving threats to U.S. security, such as the proliferation of ballistic missiles and weapons of mass destruction to developing nations."**¹⁰²

Chairman of the Joint Chiefs of Staff, Gen. Colin Powell, added: **"Patriot missiles deployed in Saudi Arabia and other countries have also done the job in rendering the Scud missile strikes less effective."**¹⁰³

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "There were no Scuds launched last night. However, just prior to coming over here, two Scuds were launched from the central Iraq area and were, obviously aimed toward KKMC [King Kalid Military City]. I don't have any results as to any injuries or damage, and if that comes prior to conclusion of this news conference we'll update you. That brings the total number of Scuds fired to date to 70.

Q: Do you have any further word on this most recent Scud launch towards Hafr Al Batin? Were the Scuds intercepted, did they cause any damage, was it a conventional warhead?

A: Quite frankly, I don't. In fact, it's really funny, I swept into the war room and said I'm on the way to come over here, is there anything new. And General Johnston, who you're all familiar with, said no, nothing's happening. Then I just happened to talk to the J-3 on the way out, and I said is anything going on? He said, other than the Scud launch. I said what Scud launch? General Johnston said, oh, I thought you knew about it. I said no, I didn't know about it because you can't hear the sirens or alarms in where we normally work. So I was completely ignorant of it, so I just got whatever I could get on the way over, and basically it was that there were two confirmed launches, that they were on an azimuth, and we can determine basically from where they were shot from and on the azimuth where they were shot at, basically where they would impact. That's why I said in the KKMC area. Essentially, beyond that, I don't have any other reports to give you. It takes a

¹⁰⁰ U.S. Congress. Senate. Committee on Armed Services. Department of Defense Authorization for Appropriations for Fiscal Years 1992 and 1993. Hearings before the Committee on Armed Services. Feb. 21, 1991. 102d Congress, 1st Session. Washington, G.P.O., 1991. p. 15.

¹⁰¹ Ibid., p. 107.

¹⁰² Ibid., p. 117.

¹⁰³ Ibid., p. 53.

little while within our reporting process to say if, in fact, Patriots engaged or did not engage, and it even takes longer to say if in fact any damage or injuries occurred."¹⁰⁴

FEBRUARY 22, 1991

Riyadh, Saudi Arabia: At the Joint Arab Forces Command news briefing, Col. al-Rubayan said: "At 2100 hours [last night] one Scud was fired in the direction of Hafr al-Batin. Its path placed it well outside any danger area, and it was allowed to crash harmlessly in the desert. There were no need to attempt for intercept. At 2:30 this morning a single Scud was fired in the direction of Dhahran and Bahrain. It was intercepted by a Patriot missile and destroyed. The debris fell into the Gulf."¹⁰⁵

The Pentagon: Gen. Kelly said: "There was one Scud launched in the last 24 hours toward Saudi Arabia. The missile broke in two and impacted in the Arabian Gulf near Qatar. No injuries were reported.

Interestingly, the three Scuds that were launched yesterday that we told you about, toward Saudi Arabia, toward King Khalid Military base were all launched from inside the city limits of Baghdad. So from that, we derived that the Iraqis are trying to use the civilian population of Baghdad to protect their Scuds. There have been a total of 72 Scud launchers so far -- 37 toward Saudi Arabia, 35 toward Israel. The weekly summary, for this past week is, the week we're in now -- very newly into -- is four, and the other numbers haven't changed."

In response to a question, General Kelly said: "In terms of their ability to shoot Scuds, I can't think of one they've shot in the past two weeks that didn't fall apart en-route. I think . . ."

Q: They still can shoot the Scuds.

A: Kelly: Yes, and the Scud's a terror weapon, and somebody can flip a grenade out of a car any time, too. We won't know until we get them all.¹⁰⁶

FEBRUARY 23, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "At approximately 0500 this morning a single Scud was fired toward eastern Saudi Arabia. The missile appears to have broken up in flight, landing somewhere in the desert or remote area. We have no reports

¹⁰⁴ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 21, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, pp. 1, 4-5.

¹⁰⁵ Joint Arab Forces Command News Briefing. Col. Ahmed al-Rubayan. Riyadh, Saudi Arabia. February 22, 1991 (11:35 EST). Transcript.

¹⁰⁶ Pete Williams, Lt. Gen. Thomas Kelly, and Rear Admiral Mike McConnell. Pentagon Briefing. Feb. 22, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1, 9.

of any damage or any injuries. That brings us to a total number of 73 Scuds fired since this campaign began.¹⁰⁷

Riyadh, Saudi Arabia: At the Joint Arab Forces Command military briefing, Col. al-Rubayan said: "A Scud was fired toward the eastern province at 5:00 this morning. It was, of course, [not intended] for any targets of value and fell harmlessly in the desert."¹⁰⁸

The Pentagon: At a briefing, Gen. Kelly said: "Two Scuds were fired in the last 24 hours, as you probably know -- one at 2103 last night, Eastern Standard Times (9:03), broke up in flight; one was launched at 1148 this morning, just before the deadline. The one last night towards Saudi Arabia; the one today towards Israel. A total of 74 Scud launches have been fired -- 38 towards Saudi Arabia, 36 towards Israel. The weekly summary for week six is six Scuds so far.

Yesterday, we reported that Scud debris fell in Qatar. That was a mistake. It actually fell in Bahrain."¹⁰⁹

FEBRUARY 26, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Neal said: "As you all know, at 8:23 last night a Scud was launched from southern Iraq. The warhead struck a single level, corrugated building occupied by U.S. forces. Twenty-eight American soldiers were killed, 100 were wounded. The casualties were taken to a combination of U.S. and Saudi hospitals, with the more seriously injured being readied for evacuation to other hospitals outside the area of responsibility. Reports indicate that the killed were due to a blast resulting from a warhead striking the building. The investigation is still underway."¹¹⁰

Riyadh, Saudi Arabia: At the Joint Arab Forces Command news briefing, Col. Robayan said: "We deeply regret the terrorist Scud attack last night on the U.S. barracks that claimed 28 lives and wounded nearly 100 of our allies. In addition to that Scud attack, another missile was fired at 1:30 this

¹⁰⁷ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 23, 1991 (10:00 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

¹⁰⁸ Joint Arab Forces Command Military Briefing. Col. Ahmed al-Rubayan. Riyadh, Saudi Arabia. February 23, 1991. Transcript.

¹⁰⁹ Pete Williams, Lt. Gen. Thomas Kelly, and Rear Admiral Mike McConnell. Pentagon Briefing. Feb. 23, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 3.

¹¹⁰ Brig. Gen. Richard I. Neal. CENTCOM Briefing. Feb. 26, 1991 (10:30 a.m., EST). Riyadh, Saudi Arabia. Transcript, p. 1.

morning toward Qatar. Iraq has 41 Scuds toward Saudi Arabia and one each toward Bahrain and Qatar."¹¹¹

The Pentagon: At a briefing, Gen. Kelly said: "In the Scud attack yesterday there were 28 killed and 100 injured.

On Scuds, there were seven Scuds launched in the last 72 hours -- two on Saturday, one on Sunday, to KKMC (King Khalid Military City) and two towards Israel, then one on Monday towards Saudi Arabia -- that was Dhahran where the casualties were suffered -- and one towards Qatar. A total of 81 Scud missiles were launched -- 41 against Saudi Arabia, one against Bahrain, one Qatar, and 38 against Israel."

Q: General, what happened with the Scuds yesterday, after 40 or so successful Scud launches, was there complacency by the troops? Did something happen? Was there a mistake made? Can you tell us what happened?

A: Kelly: I think there was clearly not complacency. There is an investigation ongoing in Saudi Arabia right now. I don't know what the facts are, so it would be wrong of me to conjecture. I'm certain that the results of that investigation will be made known as soon as it's completed, just as we have with the other unfortunate incidents that have occurred.

Q: Can you give us some more details on the Scud incident? Anything at all?

A: If you have any specific questions, I don't have any more details than what General Kelly . . .

Q: Why did it happen, what were the problems?

A: As he said, that's being looked into. I don't know what the answers are yet.

Q: On the Scud attack, do you know if there was any kind of a bunker available for those soldiers, and if there was adequate time with the air raid signal?

A: I don't know the answer to either one. They would know that over in Riyadh or Dhahran, but I don't have the answer."¹¹²

FEBRUARY 27, 1991

Riyadh, Saudi Arabia: At a CENTCOM Briefing, Gen. Norman Schwarzkopf said: "Peace is not without a cost. These have been the U.S. casualties to date. As you can see, these were the casualties we had in the air war; then of course, we had the terrible misfortune of the Scud attack

¹¹¹ Joint Arab Forces Command News Briefing. Col. Ahmed al-Robayan. Riyadh, Saudi Arabia. February 26, 1991. Transcript.

¹¹² Pete Williams, Lt. Gen. Thomas Kelly, and Rear Admiral Mike McConnell. Pentagon Briefing. Feb. 26, 1991 (3:00 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1, 6, 11-12.

the other night, which, again, because the weapon malfunctioned, it caused death, unfortunately, rather than in a proper function."¹¹³

FEBRUARY 28, 1991

The Pentagon: At a briefing, Gen. Thomas Kelly said: "Our casualties, we continue to break them down: ... 28 [killed] in the Scud attack; 100 [wounded] in the Scud attack.

There have been zero Scuds fired in the last 24 hours. A total of 81 Scuds had been fired."¹¹⁴

March 13, 1991

House Committee on Appropriations: In testimony, Maj. Gen. Richard Beltson, Deputy for Systems Management, OASD for Research, Development, and Acquisition Missile Procurement, Army, noted that the Patriot fire units were "receiving world-wide recognition for their unprecedented success in Operation Desert Storm." He added that "as far as we are able to tell, about the only problem with the Patriot was the generator that was supposed to keep working....[it] was an old gas engine, and it had a very high failure rate.

In response to questioning about Patriot firing doctrine by Rep. McMurtha, Gen. Beltson stated: "...to get the probability of kill where we wanted it, we had decided on our doctrine, which is the minute we had an incoming, we launched two missiles. The problems was that the Scuds broke up, and in one case we fired four Patriots against one Scud which was in two pieces and missiles would go after the debris. I think that later when we figured this out, and in certain locations where we knew they wouldn't break up, this is the extended Scud where they were welding them together and not doing a good job of the weld, we were only shooting one missile. It depended on which location you were firing from and there were different doctrines. The Israelis wanted to work manually. We were working on an automatic launch."¹¹⁵

House Committee on Appropriations: In response to questions about the performance of various weapon systems in Desert Storm, the Army prepared a paper that concluded, among other things: "The Patriot system was used to engage only 'threatening' Scuds within the missile footprint. Of the 47

¹¹³ Gen. Norman Schwarzkopf. CENTCOM Briefing. Feb. 27, 1991 (1:00 p.m., EST). Riyadh, Saudi Arabia. Transcript, p. 6.

¹¹⁴ Pete Williams, Lt. Gen. Thomas Kelly, and Rear Admiral Mike McConnell. Pentagon Briefing. Feb. 28, 1991 (3:30 p.m.) Office of Assistant Secretary of Defense (Public Affairs). Transcript, p. 1.

¹¹⁵ U.S. Congress. House. Committee on Appropriations. Hearings Before the Subcommittee on the Department of Defense on Department of Defense Appropriations for 1992. 102d Congress, 1st Session. Washington. G.P.O., 1991. pp. 125, 132-133.

Scuds against which it fired, Patriot successfully intercepted 45. Throughout its entire period of employment in SWA the system demonstrated an overall operational readiness rate above 95%. Following Scud attacks on Dhahran and Riyadh during January 1991, a senior Air Force official said, "...no one should underestimate the value of the Patriot system in this war....In the historical analysis and stories of this war, Patriot will be one of the key systems which influenced the outcome."¹¹⁶

March 19, 1991

Senate Armed Services Committee: In testimony, Gen. Carl Vuono, Chief of Staff, U.S. Army, stated: "The now world-famous Patriot PAC-2 missile (also initially fielded during Operation Desert Storm) has achieved spectacular results."¹¹⁷

April 17, 1991

House Committee on Appropriations: In testimony, Amb. Henry Cooper, Director, SDIO, said, regarding Patriot's performance: "It is difficult to imagine a better validation of President Bush's redirection of SDI and continued approach to our negotiations with the Soviet Union than the clear lessons of the recent Gulf War."¹¹⁸

July 1991

The Interim Report to Congress on Conduct of the Persian Gulf Conflict concluded: "Patriot's anti-Tactical Ballistic missile (TBM) capability provides a self-defense and limited area protection capability. Intercept success is defined as preventing damage to the asset/protected area by killing the warhead and/or diverting the warhead off its intended trajectory. Preliminary indications are that Patriot successfully intercepted the majority of Scud missiles that were within its engagement envelope....In the case of the Scud attack on the Army barracks in Dhahran, it appears that the Patriot battery did not effectively detect the incoming missile due to software problems. The Patriot computer had apparently miscalculated target location. Software modifications were

¹¹⁶ U.S. Congress. House. Committee on Appropriations. Hearings Before the Subcommittee on the Department of Defense. Pt. 7. Washington, G.P.O. 1991. p. 61

¹¹⁷ U.S. Congress. Senate. Committee on Armed Services. Department of Defense Authorization for Appropriations for Fiscal Years 1992 and 1993. Hearings before the Committee on Armed Services. Feb. 21, 1991. 102d Congress, 1st Session. Washington, G.P.O., 1991. p. 277.

¹¹⁸ U.S. Congress. House. Committee on Appropriations. Hearing Before the Subcommittee on the Department of Defense. 102d Congress, 1st Session. Pt. 7. 1991. Washington, G.P.O., p. 613.

subsequently applied in theater to correct the problem. The Army modified the Patriot--which was originally designed to destroy aircraft--into a successful anti-tactical ballistic missile system. **While this initiative appears to have been relatively successful, there is room for further improvement. Data gathered from the operation should permit a more detailed evaluation of Patriot's ability to destroy Scud warheads and its potential capability against more sophisticated targets.** Under a section titled Emerging Observations: "Patriot required software modifications while in theater to improve its anti-tactical ballistic missile capability. **Due to the nature of the system and some failures to kill the warhead, Patriot did not always prevent damage even if it intercepted a Scud.**"¹¹⁹

December 6, 1991

Huntsville, Alabama. In a statement issued by BG Robert Drolet, U.S. Army Program Executive Officer for Air Defense, the Army said: "In Saudi Arabia, Patriot successfully engaged over 80 percent of the TBMs within its coverage zone [and] in Israel . . . Patriot successfully engaged over 50 percent of the TBMs in the coverage zone."¹²⁰

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¹¹⁹ Department of Defense. Conduct of the Persian Gulf Conflict. An Interim Report to Congress, pursuant to Title V. Persian Gulf Conflict Supplemental Authorization and Personnel Benefits Act of 1991 (Public Law 102-25), pp. 6-6, 6-12.

¹²⁰ Inside the Army. PEO Air Defense Responds to Patriot Criticisms. Dec. 9, 1991.